THE IRON TRADE REVIEW

VOLUME XXXIV. CLEVELAND, O., JUNE 27, 1901. NUMBER 26

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The week's developments are unmistakably favorable to a broadening market. Both in pig iron and in finished material there is activity that signifies the continuance through the second half of the year of the tremendous consumption now under way. While June opened with few signs of new activity, they are plentiful as the month goes out. The possibility of labor troubles becoming a serious factor seems to have less consideration from buyers with each week. The machinists' strike is still on, and in certain localities is attended with an almost complete shut-down in the metal-working trades, but the number of men at work is increasing and the dwindling of strike benefits is having its effect. The molders in the Central West are conferring at Cincinnati with their national officers and their decision on the proposal to strike will soon be known. The conference between the Amalgamated Association and the tin plate manufacturers ended in agreement at Cleveland Tuesday night, and the sheet mill scale is now under consideration at Pittsburg. The bar iron conference adjourned without agreement and is to be resumed on Friday. The non-interruption provision, as amended at the Milwaukee convention, is the bone of contention. The buying of the week in pig iron was restricted for the most part to foundry iron. Some large lots have been bought, and at Chicago malleable interests have inquired for two 10,000-ton blocks, deliveries extending a year ahead. Southern selling still shows irregular prices, the Birmingham basis for No. 2 foundry ranging from $10 to $10.50. A factor to which furnacemen call attention is the urgency with which shipments are called for, in many instances buyers asking that deliveries be anticipated. The largest consumer of Bessemer iron has bought several thousand tons for prompt delivery, in the past week, but apart from coke deals which involved some of the recently reported sales for July and August delivery, it is understood that business for the second half is still in abeyance. The merchant furnacemen of the Valleys are considering the price for the second half, and one element favors $15 75 at furnace, which the producers consider is not out of line with $24 billets. The steel market continues firm, but there is a somewhat easier condition in the open-hearth market, owing to the contribution of the Johnstown, Pa., mill. The inquiry for steel from independent mills has been quite heavy. In finished material, plates and structural shapes are of chief interest. Lake shipbuilding is full of promise and inquiry has come up for 55,000 to 60,000 tons of plates and shapes in the past week, the bulk of it for fall and winter work; but it is understood all berths now occupied at lake yards will be filled as fast as vacated. Bridge works are specifying heavily on contracts and steel buildings, notably for iron and steel works, have contributed a good tonnage in the past week to Pittsburg mills. Sheet mills continue to run to full capacity with promise of like activity for months ahead. The American Tin Plate Co. has announced the continuance of the $4 basis through the fourth quarter, though there were some reasons for expecting an advance. Bar mills may close in the first week in July, but in all lines the shut-down will be brief if the condition of trade governs.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, June 26.

There is every indication of a pretty general shut down of the sheet, tin plate and bar iron mills next week pending the settlement of the Amalgamated Association wage scales. The conference on the bar iron scale resulted in nothing definite and another conference will be held here on Friday of this week. The non-interruptive clause as amended in convention is not at all satisfactory to the manufacturers and this more than the scale is said to be the stumbling block. The conference on the sheet scale commenced here today. As yet there has been no settlement of the tin mill and tin house workers' scales although conferences for the adjustment of both have been held. The plants of the National Tube Co. will be closed next week for repairs, but will resume immediately thereafter and the mills of the Carnegie Steel Co. may be closed several days next week over the Fourth of July. The mills of some of the independent manufacturers will also shut down for a week to two weeks for inventory and repairs.

The tin plate and sheet mills can ill afford a shut down at this time owing to the large tonnage that is being carried on their books and the manufacturers are not desirous of closing their mills for any extended period. The same holds true of the bar mills of the combine.

That the United States Steel Corporation is to pursue a conservative policy so far as prices are concerned was again brought to the notice of the trade this week when the American Tin Plate Co. issued a circular announcing that the price of tin plate for delivery during the fourth quarter of the year would be the same as the price for the third quarter, $4 per box of 100 pound coke plates. The trade expected an advance owing to the heavy demand and the high price of foreign tin plates which has practically cut off all competition of the foreign product for domestic consumption. This same policy was followed throughout the spring months by the National Tube Co. when all conditions appeared to justify an advance in the price of merchant pipe. As an indication of the demand for tin plate it is reported that premiums of from 25 cents to 50 cents per box are being paid for delivery in 60 days.

Both raw and finished materials continue strong generally, although there are a few weak spots in each. The Bessemer pig iron market is in excellent condition and there is little iron to be had for shipment in July. At a meeting of the Bessemer Association held in Cleveland last week it was decided to fix the minimum price for Bessemer for delivery during July at $15.25 and another meeting will be held later when the price for delivery during the last five months of the year will be fixed. Some of the furnacemen are in favor of establishing the price at $15.75 to $16 per ton at the Valley furnace. There is little doing in other grades of pig iron.

In finished lines new tonnage on plates and steel bars is not as satisfactory as it might be, although there has been no cutting of agreed prices. For vessel building, however, there is good inquiry for future delivery plates. Extensive buying in both these lines is expected within the next 30 days. Structural material rules strong with a big demand. Contracts for nearly 12,000 tons of material were closed during

the week by local concerns and others calling for fully 15,000 tons will be placed shortly for new buildings and additions.

An immense tonnage of coke was contracted for during the past week and many of the large producers are pretty well sold up. Notwithstanding the large tonnage offered the manufacturers, conservative prices were made.

The Cambria Steel Co. has come into the market during the past week as a seller of open-hearth billets. The capacity of the new open-hearth plant has increased the output of steel more than 400 tons a day above the requirements of the finishing mills. As a result of the offering of this tonnage the price of open-hearth billets has dropped to $26 and $26.50 per ton.

PIG IRON.—There is every indication that a price higher than $15.25 at the furnace for delivery commencing August and running through the remainder of the year will be fixed by the Bessemer Association at the meeting to be held this week at Cleveland. Last week the price for delivery during the remainder of this month and July was fixed at $15.25 per ton. For delivery during the remainder of the year, however, the furnacemen believed that they should receive better prices and a number of the furnacemen are anxious to have the price fixed at $15.75 to $16 per ton at the furnace. There is little Bessemer iron to be had for delivery during July as the furnaces have their output well sold up. Buying during the week was in small lots. Orders for foundry iron are confined almost wholly to carload lots and the foundrymen are still holding off on their contracts for second half delivery. As a result of this limited buying No. 2 foundry is being offered at $14.50 per ton very freely. There has been little buying of forge iron and prices are held at $14 per ton, delivered, Pittsburg. Basic iron is quoted at $14.25 at the furnace or $15, Pittsburg. We revise our quotations as follows:

Bessemer, Valley	$15 25 to $15 50
Bessemer, Pittsburg	16 00 to 16 25
No. 1 Foundry	15 00 to 15 50
No. 2 Foundry	14 50 to 14 75
No. 3 Foundry	14 00 to 14 25
Gray Forge, Pittsburg	13 75 to 14 00
Basic, Valley	14 25
Basic, Pittsburgh	15 00

STEEL.—Independent consumers of steel billets are making inquiry for material for delivery the second half of the year although no contracts have yet been closed. There is also considerable inquiry for blooms and slabs from independent manufacturers of sheets and tin plate who roll their own tin and sheet bars. Bessemer billets for prompt shipment are sold at $24.50 to $24.75 per ton, at mill, Wheeling or Valley, while open-hearth billets command from $26 to $26.50 per ton. Bessemer billets for second half delivery are not expected to sell below $24 per ton at the mill from present indications. The demand for rods for delivery during the third quarter is strong. The quotation is from $37 to $38 per ton. The Cambria Steel Co. is freely offering a large tonnage of open-hearth billets and can make deliveries on about 400 tons daily.

FERRO-MANGANESE.—A large amount of foreign ferro is being shipped into this market at the present time and sales have been made in the week at $55 per ton, delivered here. The largest domestic producer continues to quote $58.50 per ton, delivered, at the buyer's mill, in carload lots.

MUCK BARS.—The impending shut-down of many of the puddle mills has resulted in a big demand for muck bar for immediate shipment. Sales are reported at $28.50 to $29 per ton.

SKELP.—Skelp for immediate shipment continues scarce and consumers are forcing prices up on themselves. While there is much inquiry for delivery during the second half of the year there have been no contracts closed as yet. Grooved and sheared steel skelp is quoted at 1.70c to 1.80c, while sheared iron skelp for narrow widths is selling as high as 2c. Grooved iron skelp is held at 1.85c to 1.90c.

SPELTER.—The spelter market continues weak in the absence of heavy buying. Prime Western grades are held at 3.93c, delivered, Pittsburg.

RAILS AND TRACK MATERIAL.—None of the rail mills is now in position to make deliveries on new business before Dec. 1 and a number of them are filled up to Jan. 1. Light rails also continue scarce and prices continue to advance. Mills are making heavy shipments of track material and are fast catching up on the large tonnage carried by them several months ago. We revise quotations as follows: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons; $30; less than car lots, $32; light rails, 8 pounds, $45; 12 pounds, $38; 16 pounds, $35; 20 pounds, $34; 25 to 40 pounds, $32. Track material: Spikes, 1.95c to 2c; track bolts, square heads, 2.40c; hexagon heads, 2.55c; fish plates, 1.50c to 1.60c.

PLATES.—While specifications on plates are being received more freely than for several months, it is reported that some of the smaller mills are anxious to secure business. Quotations, however, are being rigidly adhered to. A meeting of the plate manufacturers will be held in New York next week but no change in prices is anticipated. Quotations unchanged are as follows: Tank plate, ¼-inch thick up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. M. B. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates more than 100 inches wide, 5 cents extra 100 pounds. Plates 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

BARS.—New business in steel bars continues light and some of the smaller mills are anxious to secure new business although no quotation below 1.40c are reported. Iron bars are held at 1.45c, Youngstown, and 1.50c, Pittsburg, which is a slight concession from prices quoted ten days ago. We quote steel bars in carload lots at 1.40c and less than carload lots at 1.45c; iron bars at 1.45c, Youngstown, and 1.50c, Pittsburg; refined bars, 1.75c and upwards.

SHEETS.—An extended shut-down of the sheet mills this summer would greatly embarrass customers many of whom are already compelled to wait from three to four months for deliveries. At present no shipments can be made within less than two months and premiums of 25 cents per hundred pounds are being offered for shipments within 30 days. The sheet conference on the Amalgamated scale commenced here today and both the manufacturers and consumers are anxious to bring about a speedy settlement. There will be a temporary shut-down of many of the mills of the American Sheet Steel Co. beginning next week even if there is a settlement of the scale this week. Galvanized sheets are in good demand but are ruling relatively low on account of the low price of skelp. We make the following quotations: Black sheets, one pass through cold rolls, No. 30, 3.65c; No. 29, 3.55c; No. 28, 3.35c; No. 27, 3.25c; Nos. 25-26, 3.15c; Nos. 22-24, 3.05c; Nos. 19-21, 2.95c; Nos. 17-18, 2.80c; Nos. 15-16, 2.70c; Nos. 13-14, 2.60c; Nos. 10-12, 2.50c. For more than carload lots a reduction of 5 cents per 100 pounds is made; for less than carload lots an advance of 15 cents per 100 pounds over the above price is asked. Galvanized sheets are held at 70 and 5 off.

PIPES AND TUBES.—The demand for merchant pipe, tubes and casing continues very satisfactory and all the mills of the National Tube Co. as well as those of the independent manufacturers continue in full operation. The mills of the National Tube Co. will be shut down next week for repairs. Prices remain firm but unchanged. Discounts to consumers in carload lots, Pittsburg, are as follows

MERCHANT PIPE.

	Carload lots. Black Per cent.	Carload lots. Galv. Per cent.	Less than carload lots. Black Per cent.	Less than carload lots. Galv. Per cent.
⅛ to ⅜ and 11 to 12 in.	59.2	46.2	54.9	40.9
½ to 10 inches	66.7	53.3	61.9	49.9

BOILER TUBES.

	22 Feet and under. Per cent. Iron.	Steel.
1 to 1¼ and 2¼ to 5 inches, inclusive	43½	65½
2 to 2¼ inches, inclusive	43	60
6 inches and larger	53	59

CASING.

	S. and S. Per cent.
2 to 3 inches	58
3¼ to 4 inches	63
4½ to 12½ inches	65

O. D. PIPE.

	Per cent.
14 to 22 inches	42
24 inches, o. d. and larger	37

THREADS AND COUPLINGS.

	Per cent.
14 to 16 inches o. d.	35

STRUCTURAL MATERIAL.—Within the next few months contracts for fully 15,000 tons of structural material for building purposes will be awarded here. Plans for a number of new buildings are being drawn up and additions to several large structures have been decided upon. One of the largest contracts placed during the week was awarded to the Riter-Conley Mfg. Co. for the erection of the buildings for the new mills and additions for the Colorado Fuel & Iron Co. The contract calls for about 10,000 tons of material. William B. Scaife & Sons also secured a large contract from the Colonial Steel Co. for the erection of the buildings of its new plant. The contract will call for about 2,000 tons of material. Our quotations unchanged are as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

WIRE AND WIRE NAILS.—Demand for wire and cut nails is reported extremely good for this season of the year. There is also a big demand for wire products. Prices continue unchanged as follows: Single carloads of wire nails to jobbers, $2.30, Pittsburg; to retailers, $2.40; plain wire, carload lots, is quoted at $2.25 to jobbers and $2.35 to retailers; painted barb wire, $2.60, in carload lots to jobbers, and $2.70 to retailers; galvanized barb wire, $2 in carload lots to jobbers, and $3 to retailers. Cut nails are quoted at $2, Pittsburg, in carload lots, 2 per cent off in 10 days.

MERCHANT STEEL.—The demand for shafting is not quite as large as the manufacturers could desire but from inquiries on hand a large amount of business will be placed in July for delivery during the second half. Specifications on running contracts are not being received as freely as expected, but thus far the manufacturers have not suffered on account of lack of orders to keep their mills in full operation. We revise quotations as follows: Turned, cold rolled and ground shafting at 55 per cent off for car lots and 50 per cent off for less than car lots; tire steel in carload lots and over, 1.60c; less than carload lots, 1.75c to 1.80c. Toe calk is held at 1.70c in large lots, and in small lots as high as 1.85c. Tool steel is held at 7c and upwards, according to quality; hoops and bands, 1.85c to 2c.

OLD MATERIAL.—The old material market continues quiet with little inquiry and limited sales. Prices are weak. We revise, quotations, gross tons, as follows: Heavy melting stock, $15.50 to $16; low phosphorus melting stock, $16.50 to $17.50; steel rails, $15.50 to $16; busheling scrap, $13.50 to $14; No. 1 wrought, $16 to $17; iron rails, $18 to $19; cast borings, $7.50; cast scrap, $13 to $13.50.

COKE.—Both Connellsville and outside coke manufacturers placed the bulk of their output for delivery the second half of the year during the past week. On outside furnace coke no better than $1.50 per ton was done at the furnace and as high as $1.75 per ton was paid for the better grades. Connellsville furnace coke was closed at $1.85 to $2 per ton. A large amount of foundry coke was also contracted for. The Connellsville producers secured from $2.25 to $2.50 per ton and the outside interests from $1.95 to $2.15 per ton. Owing to the washing out of the railroad tracks in the Bluefield district in West Virginia by the flood that swept that region, shipments of coke from plants in that vicinity cannot be made within less than two weeks. As a result there is much inquiry for coke for prompt shipment and manufacturers who have any in stock are securing somewhat better than ruling quotations. For the week ending June 15, the production of the Connellsville region amounted to about 212,000 tons. As a result of this falling off in production stocks are getting very low. The shipments from the region amounted to 11,163 cars which is a slight increase over the shipments of the previous week.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
534 MONADNOCK BLOCK, June 25.

The marked improvement in the local pig iron situation noted last week, continues, and there is every indication that the market is on the threshold of a period of heavy buying covering needs for the last half. The aggregate tonnage booked during the past week is well up in the thousands, the business coming from every class of trade. Among the inquiries received were two asking delivery on 10,000 tons of iron at malleable works in the first half of next year. Southern irons are firmer this week than for many weeks past, inquiry for about 5,000 tons being in the market. There appears to be no disposition among foundrymen to curtail shipments in view of the threatened molders' strike; but on the contrary, they are receiving metal ahead of the time contracted for where they can get it. The local situation is also improved by the fact that a number of machine shops have recommenced work. In finished lines consumption remains as heavy as heretofore. It is not yet definitely known whether any of the mills will shut down during the midsummer weeks, but it is hoped by many they will not.

PIG IRON.—The market is even better than it was last week. A large number of orders have been booked, the aggregate tonnage being well into five figures. Two inquiries were received from malleable iron concerns asking for delivery on 10,000 tons extending through the first half of next year. The threatened molders' strike does not seem to have made any impression, for foundrymen continue to demand prompt shipments of metal on old contracts. One surprising feature of the heavy buying during the past two weeks, is the large number of inquiries for immediate delivery. Southern irons continue to grow stronger, consumers apparently taking advantage of the low prices that have been prevailing. We quote prices unchanged as follows:

Lake Sup Charcoal...	$17 50 to $18 00	Southern Coke No. 4,$	3 90 to $14 15
Local Coke Fdy. No.1	16 00 to 16 50	Southern No. 1 Soft...	15 40 to 15 55
Local Coke Fdy. No.2	15 50 to 16 00	Southern No. 2 Soft...	14 90 to 15 15
Local Coke Fdy. No 3	15 00 to 15 50	Southern Silveries.....	15 45 to 15 50
LocalScotchFdy.No 1	16 00 to 16 50	Jackson Co. Silveries	17 00 to 17 50
LocalScotchFdy No 2	15 50 to 16 00	OhioStrong Softeners	16 50 to 17 00
LocalScotchFdy No 3	15 00 to 15 50	Alabama Car Wheel...	21 00 to 22 05
Southern Coke No. 1	15 15 to 15 65	Malleable Bessemer..	16 00 to 17 00
Southern Coke No. 2	14 65 to 15 15	Coke Bessemer.....	17 50 to 18 50
Southern Coke No. 3	14 15 to 14 65		

BAR IRON.—There is no lessening in the volume of business that continues to be placed. The two independent mills in this locality are sold well ahead, and are getting prices slightly better than quotations for current delivery. One concern stated that the unsolicited orders received daily are alone sufficient to keep its mills going. The business comes from all branches of the manufacturing trade, the orders averaging between 200 and 300 tons. We quote prices at 1.55c to 1.65c for iron, and 1.60c to 1.65c for steel.

STRUCTURAL STEEL.—While there is considerable building going on in Chicago, there is little that calls for the use of structural steel. Manufacturers, however, continue to receive a steady stream of orders for structures being erected in the suburbs and outlying districts. We quote mill shipments, car load lots, as follows: Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; angles, 1.75c to 1.80c; plates, 1.75c; tees, 1.80c; zees, 1.75c; small lots from store, ¼c higher; beams and channels from store, ½c per pound higher.

SHEETS.—Jobbers who are fortunate enough to have on hand a good supply of this material are profiting most by the existing situation. Manufacturers are some weeks behind in deliveries, and naturally orders calling for immediate shipment are transferred to owners of warehouses with a stock on hand. These latter benefit by the premiums which usually accompany orders of this kind. We quote prices, as follows: No. 27 black, 3.40c to 3.50c, and galvanized 65 to 10 per cent from store and 70 per cent and 5 per cent from mill, Pittsburg.

BILLETS.—Though many inquiries are received, manufacturers are not taking orders as they can use all their billets to much better advantage.

RAILS AND TRACK SUPPLIES.—Both local manufacturers of light rails and track supplies are sold from 60 to 90 days ahead, and are booking no further orders for delivery within that period. Inquiries are plentiful for all kinds of track supplies. Quotations are as follows: Standard rails, $28; light sections, $33 to $35, according to size; out of store, $40 to $44; splice bars, 1.60c to 1.70c; spikes, 1.90c to 2c; track bolts, hexagon nuts, 2.80c to 2.90c; square nuts, 2.65c to 2.75c.

PLATES.—The capacity which some of the local manufacturers had unsold several weeks ago is being rapidly taken up, and indications are that in a few weeks there will be no more plates for sale, delivery this year. Prices remain as follows, base rate: Tank steel, 1.75c; flange steel, 1.90c to 2c;

marine steel, 1.95c; firebox steel ordinary, 2c to 2.10c; firebox, special, 2.25c and upwards. Tank steel from store, 1.90c to 2c, flange steel from store, 2c to 2.10c.

MERCHANT STEEL.—The conditions remain about the same as we have reported for several weeks past. Some implement contracts have been closed during the past week, and several more are still pending. We quote prices, as follows, mill shipments, Chicago delivery: Smooth finished tire steel, 1.90c to 2c; open-hearth spring steel, 2.50c to 2.75c; toe calk, 2.40c to 2.60c; sleigh shoe, 1.85c to 1.90c; cutter shoe, 2.40c to 2.60c; ordinary tool steel, 6c to 7c; specials, 13c and upwards. Cold rolled shafting carload lots, 55 per cent and upward.

MERCHANT PIPE.—There is no diminution in the orders that are daily booked, business being excellent from all points. We quote manufacturers' prices, unchanged, as follows:

MERCHANT PIPE.

	In carloads. Blk.	Galvd.	Less than carloads. Blk.	Galvd.
⅛ to ¼ inch and 11 to 12 inches	59.2	46.2	54.9	40.5
⅜ to 10 inches	66.7	53.3	61.9	49.9

WIRE AND WIRE NAILS.—The condition of the market in these materials is best reflected by the report that the local manufacturer is seriously contemplating running its plants all summer. In view of the heavy business in prospect for the last half of the year, assured by the excellent crop that will be reaped in all parts of the West, it is the expectation that the mills of the local manufacturer will continue in operation during the heated term. Prices remain unchanged, as follows: Carloads of wire nails to jobbers $2.40, Chicago; to retailers, $2.50; plain wire, carload lots to jobbers, $2.35; to retailers, $2.45; painted barb wire to jobbers, carloads, $2.70; to retailers, $2.80; galvanized barb wire, carloads to jobbers, $3; to retailers, $3.10.

OLD MATERIAL.—There is no appreciable change in the local situation, consumers not caring to place orders until after the taking of inventory. This and other causes, which we have explained heretofore, have resulted in weakening the market to an extent that has not been felt for some time. Dealers' selling prices per gross ton, are as follows:

Old iron rails	$19 00 to $19 50	Old Wheels	$16 00 to $16 50
Old steel rails, long	15 00 to 16 00	Heavy melting steel	13 00 to 13 50
Old steel rails, mixed	13 50 to 14 00	Mixed country steel	10 00 to 10 50
Relaying rails	20 00 to 22 00		

The following are selling prices per net ton:

No. 1 R. R. wrought	$14 00 to $14 50	Iron axles	$19 00 to $19 50
No. 2 R. R. wrought	12 50 to 13 00	Cast borings	4 00 to 4 50
Dealers' forge	13 00 to 12 50	Wrought turnings	9 00 to 9 50
No. 1 busheling	10 00 to 10 50	Iron axle turnings	10 50 to 11 00
Heavy cast	11 00 to 11 50	Steel axle turnings	9 50 to 10 00
Railway malleable	11 50 to 12 00	Stove plates	8 50 to 9 00
Country malleable	10 50 to 11 00	Old iron splice bars	16 00 to 16 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, June 26

The statistics of the vessel situation, as they might have been prepared some weeks ago, putting down the tonnage available, would have given at the end of June an excess of vessels, but the excess does not exist. Detention at docks has been a factor beyond anything reckoned upon, and the bunching of the ore fleet that used to happen once in weeks is now well-nigh a regular feature. A good many fewer vessels would have brought down the ore thus far carried, had there been good dispatch. As it is, the sagging in freight rates that was predicted does not occur. Grain will be a large factor in September. Bids for 2¾c for wheat from Duluth for the first half of that month have been declined by the vessel men; but something has been done at 3 cents for the second half of September, equivalent to $1.12 on ore. The ore rate is strong at 80 cents on wild charters. June has undoubtedly been a record month in shipments—probably several hundred thousand tons more than the 3,100,000 which was about the highest last season having been moved. Nothing new is reported in ore sales, but business is expected in July if the pig iron market bears out present promises.

PIG IRON.—Bessemer iron for prompt shipment has been bought in the week—a few thousand tons, at $15.25 at furnace, but the expected round lots for full third-quarter delivery are not yet placed. Foundry iron is more active in inquiry, and consumers are hastening shipments, in some cases asking to have deliveries anticipated. Gray forge has been a trifle more active, with the $13.25 basis Valley furnace generally maintained. We quote basic iron at $14.25, Valley furnace, but no large contracts are reported as yet for the remainder of the year. Cleveland quotations are as follows:

Bessemer	$16 00 to $16 25	Valley Scotch No. 1	$15 00 to $15 25
No. 1 Strong F'dry	15 00 to 15 25	Valley Scotch No. 2	14 50 to 14 75
No. 2 Strong F'dry	14 50 to 14 75	Gray forge, Valley	13 25 to 13 50
No. 3 Foundry	14 00 to 14 50	LakeSuperior charc'l	17 50 to 18 00

FINISHED MATERIAL.—The prospective requirements of lake shipyards are under discussion and the tonnage talked of means a large amount of vessel building in the next nine months. One vessel calling for 2,000 tons of plates and shapes has already been reported. Two others of like size are about closed for delivery late in the season. In addition there is provisional inquiry for between 50,000 and 60,000 tons of plates and shapes for vessels, that are likely to be under contract in the coming fall and winter. The outlook for new vessels is thus unexpectedly good. A portion of the plate tonnage included in the above, being for Chicago delivery, will no doubt be rolled in that district. Other plate and shape business is coming in liberally from bridge works, their specifications against contracts being large beyond precedent. Boiler works are also taking plates freely, so that on the whole the plate mills are in better shape than for some time. In spite of reports recently prevalent it does not appear that any business has been taken at lower than pool rates. Agricultural business for the most part is holding off until later in the summer, but indications are that buying will yet be heavy on this account. Business in bars is done at 1.40c Pittsburg for steel and 1.45c Valley, for iron. A considerable contract for open-hearth steel bars for rivets has just been closed, deliveries running through the year. The possibilities of a shut-down early in July are sufficient to bring in a steady run of orders for bar iron. Sheets are still a very strong feature. The mills can ill afford a shut-down, but much hinges on how far the Amalgamated Association will press the unionizing of all the mills of the leading producer. We continue the quotation of 3.20c to 3.25c at mill for No. 27 sheets one pass through cold rolls, and 3.30c for No. 28. Pipe business is still a strong feature and the absorption of the Shelby Steel Tube Co. by the United States Steel Corporation means continued firmness in boiler tubes and other goods on which the National and Shelby companies were active competitors. Some rail business is offering, one 800-ton inquiry from an electric line starting at Galion, O. On another 800-ton inquiry the buyer has no option but to take seconds, the mills being unable to promise deliveries for several months.

SCRAP.—The market is very dull. We hear of one local transaction of moment—a sale of 1,000 tons of crop ends at $20.50, Pittsburg. Should buying of foundry iron start up the scrap market will undoubtedly share in the movement. Concessions of $1 a ton would no doubt be necessary to move much of the accumulated stocks. We quote f. o. b. Cleveland as follows, gross tons: Old iron rails, $19.50 to $20; old steel rails, $15; iron axles, $22; old car wheels, $16; No. 1 railroad wrought, $16 to $16.50; wrought turnings, $11 to $11.50; cast borings, $6 to $6.50; No. 1 machinery cast scrap, $14; mill scrap, $14; grate bars, $8.50 to $9; stove plate, $9.50 to $10.

CINCINNATI.

June 25.

From Matthew Addy & Co. we have the following comment on the pig iron market: "As the month draws toward its end there is a very decided betterment in the situation. The tone of the market is much livelier and inquiries are being made in a most encouraging fashion. At first inquiry was confined to the very large consumers who were asking for round lots. Now, however, this is all changed and the demand is coming from every quarter and from all kinds of iron. Actual sales have been very satisfactory, ranging from 50- up to 1,000-ton lots with a very fine sprinkling of orders for 500 tons. When June opened it promised very little, but it is now apparent that the month will turn out fairly well. The inquiry at the present time is so large that if it continues there is no question but a shortage will develop in several directions, particularly in mill iron and No. 4 foundry.

The supply of these is already dangerously close. Consumers are calling for faster shipments on old orders. In fact, quite a number of concerns are attempting to have deliveries anticipated on orders that were booked for July and August delivery. The imperativeness of the demand for shipment tells its own story of the rapidity with which iron is being used. It needs no comment. In fact, the most amazing feature of the situation today is the consumptive capacity of the country. It exceeds all calculations and actual practical experience shows it is still on the increase."

We quote as follows from Rogers, Brown & Co.'s weekly review: "The tone of the market has been improved through a general belief obtaining that the business of the country will continue upon the broad plane of present dimensions. This belief is sustained by the facts; first, that while the furnaces are producing at a rate approximating 16,500,000 tons per annum, consumption exceeds that enormous tonnage, and secondly, that for a period of fully a year there has been no speculative buying whatever. The purchases the past week of some round lots of Bessemer and Northern forge irons imparted a tonic and stimulated the trade generally. There have been a large number of small and medium sized orders entered and inquiries are more numerous. A considerable number of pig iron contracts closing with this month have not yet been renewed, but will be very soon, and all the indications favor a rather active summer trade. The labor difficulties it is hoped will be speedily adjusted that that single element of disturbance may be eliminated, for aside from that the conditions are all favorable for the continued prosperity of producers and consumers alike. Prices are somewhat irregular and especially in Southern irons, which vary according to condition of order books and stocks."

We quote for cash f. o. b. cars Cincinnati: Southern coke, No. 1 foundry, $13.75 to $14.25; No. 2 foundry, $13.25 to $13.75; No. 3 foundry, $12.75 to $13; No. 4 foundry, $12.50 to $12.75; gray forge, $12.25 to $12.50; No. 1 soft, $13.75 to $14.25; No. 2 soft, $13.25 to $13.75; Lake Superior coke, No. 1, $15 to $15.25; No. 2, $14.50 to $14.75; Hanging Rock charcoal, No. 1, $20 to $20.50; Jackson Co. silvery, No. 1, $15.50 to $16; Standard Southern car wheel, $17.75 to $18.75; Lake Superior charcoal, $18.50 to $19.

PHILADELPHIA.

June 25

A more confident feeling has developed since our last report, and several important transactions have been made. None of these have, however, advanced prices, although inquiries are plentiful and consumers seem more disposed to contract for the future than has been the case for several weeks past. Old contracts are rapidly expiring, and as consumption is still maintained on a large scale, renewals must soon be given. The troubled condition of the labor market was at one time expected to exert considerable influence, but it is now believed that its extent will be less far reaching than is frequently the case at this time of the year.

PIG IRON.—Prices are about stationary, although it may be said that the situation has improved and that no decline is now expected. The opposite is rather true, although nothing can be said for a certainty until the season is further advanced. Everything is favorable for continued activity with consumption yet ahead of production. Prices remain stationary for Philadelphia and seaboard delivery as follows: No. 1 X foundry, $16 to $16.25; No. 2 X foundry, $15 to $15.50; No. 2 plain, $14.50 to $14.75; standard, gray forge, $14 to $14.25; ordinary gray forge, $13.50 to $13.75; basic (chilled), $14.25 to $14.50.

FINISHED MATERIAL.—The suspension of work by several large consumers pending an agreement to be effected with labor in various forms is beginning to make itself felt in the falling off in the demand for plates and bars. Prospects are excellent, and it is not likely that prices will go much below those now quoted, which are as follows: Plates, ¼ inch and thicker, 1.75c to 1.80c; iron bars, 1.50c to 1.60c; steel bars, 1.60c to 1.70c; angles, 1.75c to 1.85c; beams and channels, 1.75c to 1.85c.

OLD MATERIAL.—This department is dull, but prices remain about stationary, bids and offers being about as follows for delivery in buyer's yard: Choice railroad scrap, $18 to $19; No. 1 yard scrap, $14 to $15; No. 2 light scrap, $13 to $14; machinery cast, $13.50 to $14; heavy steel scrap, $16 to $16.25; old iron rails, $19 to $20; old steel rails, $15.50 to $15.75; wrought turnings, $11.50 to $12; cast borings, $8.25 to $8.75; old car wheels, $17 to $18; old iron axles, $21.50 to $22.50.

PERSONAL.

Emil Swenson, who recently resigned as superintendent of the Keystone plant of the American Bridge Co., has been appointed chief engineer of the Pittsburg Rapid Transit syndicate.

Hugh Anderson, who last week retired as master mechanic of the Andrews mill at Hazelton, O., was presented with a gold watch and charm by the employes of the mill. This week he entered the employ of the Youngstown Iron & Steel Roofing Co. of Youngstown, O., as master mechanic.

T. C. Crawford, superintendent of the blast furnaces at the Edgar Thomson plant of the Carnegie Steel Co. at Braddock, Pa., has been appointed general manager of the National Tube Works at McKeesport, Pa., vice Taylor Alderdice. Herman Brassett will succeed Mr. Crawford.

Peter L. Kimberly of Sharon, Pa., was severely injured in the wreck of the Pittsburg & Lake Erie "flyer" which occurred at South Monaca, Pa., Monday afternoon. He will recover.

Thomas Griffin, who has been chief engineer at the Shiffler plant of the American Bridge Co., at Pittsburg, Pa., has resigned to accept a similar position at the Carrie furnaces of the Carnegie Steel Co.

George Westinghouse, Jr., formerly vice-president of the British Westinghouse Electric and Mfg. Co., has been elected president of the company. Mr. Westinghouse and his American associates control nearly one-third of the British company's stock.

John Means, formerly superintendent of the North Birmingham, Ala., furnaces of the Sloss-Sheffield Coal and Iron Co. has been appointed general manager of the blast furnaces of the Dominion Iron & Steel Co. at Sydney, Cape Breton.

At the quarterly meeting of the Central Iron & Steel Co. at Harrisburg, Pa., James B. Bailey was elected treasurer and general manager to succeed the late G. M. McCauley. C. L. Bailey, Jr., was elected a director.

Ernest Vaughn, who resigned as superintendent of the Girard, O., plant of the American Steel Hoop Co., will be succeeded by W. W. Wilson.

H. B. Barnhard, superintendent of the open-hearth plant of the Tennessee Coal, Iron & Railroad Co. at Ensley, Ala., has resigned to take charge of the plant of Shickle-Howard-Harrison Co. at St. Louis.

E. K. Sober, manager of the Canton, O., plant of the American Sheet Steel Co., has resigned. Manager Ward, of Cambridge, O., succeeds him.

Joseph Rayser, superintendent of the Laura furnace of the Republic Iron & Steel Co. at Hazelton, O., has resigned on account of ill health. His successor has not yet been chosen.

W. A. Bostwick, of the Homestead Steel Works of the Carnegie Steel Co., and David Evans, of the Carrie blast furnace plant, returned from England last week where they had been for three months introducing the Monnell process of open-hearth steel making at the plant of Bolckow, Vaughn & Co., Middlesborough.

Charles J. Cushwa, formerly superintendent of the Republic Iron Works of the National Tube Co., at Pittsburg, Pa., has been appointed superintendent of the sheet mills of the Youngstown Iron & Steel Roofing Co., at Youngstown, O.

John Ramsay, formerly connected with the Virginia Coal & Iron Co. at Stonega, Va., has been appointed assistant superintendent of the mines of J. W. Ellsworth & Co., in Washington county, Pa.

The National Plow Co., in which a number of Western capitalists are interested, was organized in Jersey City June 25. The capital stock is placed at $100,000, which it is said will soon be increased to $1,000,000. The incorporators of record are James C. Young, A. J. Ross and W. R. Clements. The incorporation papers have not as yet been filed.

THE IRON TRADE REVIEW

Devoted to Machinery, Metal-Working and Foundry Trade and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE IRON AND STEEL PRESS CO.,

ROSE BUILDING, CLEVELAND, OHIO.

G. H. GARDNER, President and Treasurer.
JOHN A. PENTON, Vice-President.
A. I. FINDLEY, Secretary.

A. I. FINDLEY, EDITOR.
ROBERT I. CLEGG, EDITOR MACHINERY DEPARTMENT.

CHICAGO: 984 Monadnock Block, GEO. H. GRIFFITHS, Manager.
PITTSBURG: 429 Park Building, A. O. BACKERT, Manager.
NEW YORK: 150 Nassau St., D. C. WARREN, Eastern Manager.

Subscription, $3 per annum. To Foreign Countries, $4.00. Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

JUNE 27, 1901.

SHOP IMPROVEMENT AND ITS CRITICS.

An article by F. A. Halsey on the National Cash Register Co.'s welfare work is reprinted elsewhere. It presents a judicial and even cool-blooded view of the shop betterment movement that has without doubt a temporary set-back from the unpleasant disagreement at Dayton. Mr. Halsey's answer to the query "What more than wages?" that has been the caption of a good many magazine articles, is in a word, "Wages." There will be prompt assent to much in the article, and the reader will find himself readily borne along to the conclusion, which recent events at Dayton will go far toward confirming—that the relation of employer and employe is a business relation and that what men want is pay, not gifts.

Yet there are some points to be considered that bear in the other direction. It is not true that all gifts cultivate in the recipient the spirit of the waiter dependent on tips, particularly gifts that are made to men collectively. Public parks, libraries and museums are free; yet they do not cultivate in those who enjoy them the dependent spirit, nor do those who avail themselves of these privileges feel that in doing so they lose one jot of self-respect.

We have said before in writing on this subject that the employer who undertakes welfare work on any other basis than that of making it pay makes a mistake; that there must be no thought of patronizing his men. At the foundaton of all must be mutual respect and mutual service. There must be fair wages, proper consideration, and a spirit of conciliation before free baths, libraries or private lockers. Perhaps one of the troubles at Dayton was that with all the large outlay for unusual comforts, attractive surroundings and educational work, there was an internal competition that imposed a heavy strain on the men. Ambitious heads of departments pushing for records, with the laudable ambition of excelling themselves and others, may have forgotten the pressure to which the men were subjected.

But if the management is consistent with itself—not the easiest thing where superintendence is so diversified—we cannot understand why the willingness to relieve shop work of some of its drudgery should arouse in employes any sentiment of opposition or any feeling that they were losing in wages the amount applied to something for which they had not asked. The statement of the National Cash Register Co. referring to its recent trouble said that large sums of money were spent in bettering the condition of its employes—as much as 2 per cent of its pay rolls. If 2 per cent as a maximum is the cost of such elaborate work as the Dayton concern undertook, it can be appreciated that the outlay of the average establishment employing a considerable number of men would be a scarcely appreciable addition to the pay envelope. The economy in these things lies in supplying one outfit for a large number of individuals. Baths, for example, can be made available for 100 persons at an insignificant cost per person, while if each individual workman were to provide the same advantage in his home the expense would be in many cases prohibitive.

Who can say that the cost of Mr. Carnegie's institute and club house at Homestead, if distributed among the employes in wages, would have brought an appreciable fraction of the benefit that has come to that community through the establishment and endowment of this institution. The brightening of life and the enlargement of horizon that come from this use of a portion of the profits of industry should not be put in the balance for a moment against the trifles that if scattered through a thousand pay envelopes might be spent injuriously or dribbed away in things of momentary value.

We are well aware that this statement may be distorted by some. We shall expect to have some critic call it a covert argument against liberal wages, based on the improvidence and dissipation of many men who earn good wages. It is nothing of the kind. We are not talking about wages, but about the disposal of a portion of the employer's profits. The point is simply that if the business can stand something more than the going wage, or, as at Homestead, the highest average wage paid anywhere, the welfare institution is a form of investment that guarantees the expenditure of every dollar of this extra appropriation for the direct benefit of the employes. If each individual employe got his mite of the total in money probably half of the whole would be poorly spent or even invested to the injury of the spender.

On the score of economy, then, leaving out entirely the fact that they are provided by the employer, many shop improvement features find their justification. And if they make the shop a more desirable place in which to pass 9 or 10 hours of every day, why not give credit to the enterprise and the interest of the employer who sees the point and appropriates from his profits the sum necessary to carry on such a work.

Wages are determined largely by conditions and forces outside of an individual shop. They are not subject, except in very narrow bounds, to alteration by the individual proprietor. After paying the average going wage or even the highest wage for a given class of work, as was done at the Dayton shop, there is left no more practical form in which the employer's interest in the welfare of his employes can express itself, nor one giving larger benefit for the expenditure, than that represented in the latter-day shop improvement method. We shall be sorry to see it given up, and we do not believe it will be given up. Whatever is faulty in it is far outweighed by the good it has done.

WIRE ROD AND WIRE NAIL PRODUCTION IN 1900.

In the current issue of the *Bulletin* of the American Iron and Steel Association, statistics are given of the production of iron and steel wire rods and of wire nails in the United States in 1900. They reflect the result of the high prices of 1899 and the early months of 1900 in checking consumption.

The production of iron and steel wire rods amounted to 846,291 gross tons, against 1,036,398 tons in 1899 and 1,071,683 tons in 1898, showing a decrease of 190,107 tons, or over 18 per cent., in 1900 as compared with 1899. Of the total production in 1900, 1,929 tons were iron rods and 844,362 tons were steel. Pennsylvania made the largest quantity of wire rods in 1900, with Illinois second, Ohio third, and Massachusetts fourth. Six other states, Connecticut, New York, New Jersey, Kentucky, Alabama and Indiana, also rolled wire rods in 1900.

The production of steel wire nails in the United States in 1900 amounted to 7,233,979 kegs of 100 pounds, as compared with 7,618,130 kegs in 1899, a decrease of 384,151 kegs, or over 5 per cent. In 1898 the production amounted to 7,418,475 kegs, in 1897 to 8,997,245 kegs, in 1896 to 4,719,860 kegs, and in 1895 to 5,841,403 kegs. The wire nails produced in 1900 were manufactured by 56 works, three less than in 1899. The following table gives the production of wire nails in 1899 and 1900 in kegs of 100 pounds:

States—Kegs of 100 pounds.	1899.	1900
Massachusetts, Rhode Island and Connecticut	176,877	212,584
New York and New Jersey	49,603	63,466
Pennsylvania	2,905,211	2 158 99
Maryland, West Virginia, Alabama and Ohio	2,154,823	2,516,391
Indiana and Illinois	2,184,662	2,195,672
Michigan, Wisconsin, Kansas, Washington and California	146,954	87,467
Total.	7 618 130	7,233,979

Five Large Freighters to Come Out in 1902.

It was announced, a few days ago, that the contract for two steel freight steamers of about 6,000 gross tons capacity placed with the American Ship Building Co. by Capt. John Mitchell of Cleveland had been followed by another order for a large freighter to come out next year. Later information is to the effect that the order is for three steamers instead of one, so that the consolidated lake yards will soon have under way five large cargo ships for 1902. The vessels are to be of the same dimensions and about the same power as the six steamers of the Planet fleet (Mars, Venus, Saturn, etc.) recently completed for J. C. Gilchrist and others of Cleveland. It is understood that representatives of Milwaukee coal interests as well as some of the officers of the ship building company are to control the vessels and that they will probably be managed, if not sold while under construction, by W. E. Fitzgerald of Milwaukee. Dimensions and other particulars of the new ships are: Length over all, 366 ft.; length of keel, 346 ft.; beam, 48 ft.; depth, 28 ft.; engines, triple expansion with cylinders of 22, 35 and 58 in. cylinder diameters and 42 in. stroke; Scotch boilers, 170 lbs. steam pressure.—[Marine Review.

The following persons were admitted to membership in the Engineers' Society of Western Pennsylvania at its last meeting. A. N. Diehl, assistant superintendent Duquesne furnaces of the Carnegie Steel Co.; L. M. Hartzell, with Carnegie Steel Co.; H. D. Hershey, electrician with the Iron City Engineering Co.; C. F. O'Hagan, draughtsman with W. B. Scaife & Sons; J. N. Ostrom, bridge engineer; H. S. Page, assistant purchasing agent, Crucible Steel Co. of America; S. H. Rogers, secretary and treasurer, Pittsburg & Birmingham Traction Co.; S. B. Whitney, foreman, Pittsburg Blue Print Co.; C. H. Wood, draughtsman, American Bridge Co. The house committee reported that $1,200 had been contributed by the members for the building fund and that probably $5,000 would be collected. As soon as this fund is raised it was stated that outsiders would probably make large contributions to the fund thus insuring the society its own home in the near future.

U. S. STEEL ABSORBS SHELBY STEEL TUBE CO.

Official announcement was made at the office of J. P. Morgan & Co., New York, on Saturday, June 22, that negotiations had been completed for the purchase of the Shelby Steel Tube Co. by the United States Steel Corporation. The Shelby company is the most important manufacturer of seamless tubing in the world, and it has been for the past 18 months a very considerable competitor of the National Tube Co. Bicycle tubing has been an important product of the Shelby Steel Tube Co. and it has supplied all the requirements of the American Bicycle Co., a number of the directors of the Shelby Steel Tube Co. being interested in the bicycle company. The terms on which the stock of the Shelby company will be exchanged for stock of the U. S. Steel Corporation have not been announced, but it is the intention to acquire all of the stock. The company will then doubtless be merged with the National Tube Co. and many of its officers will withdraw.

The Shelby Steel Tube Co. was incorporated in New Jersey, on February 9, 1900. Its authorized capital is $15,000,000, of which $6,000,000 is per cent cumulative preferred stock, and $9,000,000 of common stock. The amount thus far issued is $5,000,000 of preferred and $8,175,000 of common stock.

The plants which are now operated by the Shelby Steel Tube Co. are: Shelby Works, factory "A," formerly the Shelby Steel Tube Co., located in Cleveland; the Ellwood City Works, factory "B," formerly the Ellwood (Pa.) Weldless Tube Co.; the Greenville Works, factory "C," formerly the Greenville (Pa.) Tube Co.; Toledo Works, factory "D," formerly the American Weldless Steel Tube Co.; Toledo Works, factory "F," formerly the Brewer Seamless Tubing Co.; the New Castle Works, factory "G," formerly the New Castle (Pa.) Tube Co.; the Hartford Works, factory "M," formerly the Pope Tube Co.; the Albany Works, factory "N," formerly the Albany (Ind.) Mfg. Co.; the Auburn Works, factory "O," formerly the Auburn (Pa.) Bolt & Nut Co.; the Beaver Falls Works, factory "L," formerly operated by the McCool Tube Co., Beaver Falls, Pa. The capacity of the various plants when the Shelby Steel Tube Co. was formed was about 100,000,000 feet a year; it is now nearer 125,000,000 feet.

The main offices of the Shelby Co. are in Cleveland. W. E. Miller, chairman; H. A. Lozier, A. A. Pope, Charles T. Boynton, president of the company; R. L. Coleman, Frank O. Lowden, James B. Dill, B. J. Williams, L. S. Hoyt, John L. McKinney, and F. J. Carolan are the directors.

Colonial Steel Co's Plant

The Colonial Steel Co. of Pittsburg, Pa., has retained Julian Kennedy to design its buildings and machinery for the large crucible steel plant which it will erect at South Monaca, about 28 miles from Pittsburg on the Monongahela river. William B. Scaife & Sons have been awarded the contract for the erection of the buildings. Work on the erection of the plant will be commenced shortly and it is the present intention to commence making steel about the first of the year. While it is the ultimate intention to add an open-hearth mill to the plant for the present the output will be limited wholly to crucible steel of the finer grades. The estimated annual output will be about 15,000 tons. A contract for ten steam hammers has been awarded to Manning, Maxwell & Moore of New York. The boiler plant will have a capacity of about 3,000-h. p. The contracts for the boilers have been awarded to Babcock & Wilcox and the Cahall Sales Department.

The suit of William M. Blackburn, as trustee, secretary of the Carnegie Co., against Andrew M. Moreland, trustee, and the Carnegie company, to recover 2,276 shares of stock in the Carnegie company, par value of $1,000 a share, held in trust, was quietly settled in common pleas court at Pittsburg on Tuesday. Mr. Moreland was allowed $50,000 for all expenses, he to turn the stock over to Blackburn, as trustee. Mr. Moreland's original bill was $500,000.

PENNSYLVANIA RAILROAD BUYS CAMBRIA STEEL CO.

The recent announcement that Pennsylvania railroad interests had secured control of the Pennsylvania Steel Co. is followed by the statement on authority that Pennsylvania railroad officials have a majority interest in the Cambria Steel Co. It has been known that large purchases of Cambria Steel Co. "rights" as well as of stock have been made in the past two weeks; the identity of the purchasers is now made known.

That these moves of the railroad company are not considered antagonistic to the United States Steel Corporation appears from the following statement given out at New York by Chairman Gary, of the latter company:

"President A. J. Cassatt, of the Pennsylvania Railroad Co., voluntarily stated to me a few days since that his people had purchased both the Cambria Steel Co. and the Pennsylvania Steel Co., and at the same time assured me that it would be the disposition of these companies to operate in entire harmony with the United States Steel Corporation. Basing this statement on previous business transactions with Mr. Cassatt, I am pleased to say his assurances are received with perfect confidence and entire satisfaction. None of the interests of any of the steel companies will be prejudiced by reason of these purchases."

The purchase of the two steel companies by the Pennsylvania railroad not only secures to it its own supply of rails at a low price, but puts it in a position where it cannot be hurt by any action the large combine may take. The ownership of two such companies tends to develop and retain on its lines an enormous freight business. The purchase of Cambria makes it possible for the Pennsylvania to supply rails to its entire Western system with a haul only 75 miles longer than if bought from the Carnegie mills. Not only is the rail business important. There is the building of pressed steel cars. The new Cambria car shop will have a ready market for every car it can turn out.

Molders Strike Under Consideration.

In view of the meeting of the executive committee of the Iron Molders' Union at Cincinnati this week, the conference between officers of the union and representatives of the National Founders' Association appointed for June 24 at Chicago has been postponed until next week. The conference was called to consider the demand of Chicago molders for an advance of the floor and bench molders' minimum to $3 a day.

The meeting of the executive committee of the Iron Molders' Union at Cincinnati is to act upon the situation as it has developed in the past few weeks in Cleveland, Chicago, Cincinnati, Detroit and Toledo. The refusal of the $3 minimum by the Cleveland conferees has been followed by the agitation of a strike by the local molders. It is reported that Chicago molders are of like mind, and the Cincinnati meeting is for the purpose of canvassing the situation and deciding whether the union wants now to enter upon another strike after the costly one that was terminated in Cleveland in February.

(Special Telegram.)

CHICAGO, June 26.—The secretary of the Iron Molders' Union here has had no advices as yet from Cincinnati regarding the meeting of the executive committee of the union. Representatives from Chicago went uninstructed, but it is believed the molders here will strike unless concessions are made, as the men have been clamoring for a strike for over two weeks.

An order for 250 steel gondola cars for use on the government railways of Australia in New South Wales was received by the Pressed Steel Car Co. last week, through its foreign agents, the Transportation Development Co., Inc. These cars will be somewhat similar to those now in use in Australia except they will be all steel instead of wood.

Chas. C. Newton, president of the Newton Machine Tool Works, of Philadelphia, has arrived at Bremen on his annual trip abroad to attend the foreign interests of the Newton Machine Tool Works. This year he will make an extended tour through Russia and Hungary and will look after interests in Great Britain.

CARNEGIE STEEL CO. TO LEASE BOTH NATIONAL AND STEEL HOOP COMPANIES.

It has been officially announced that the Carnegie Steel Co. would lease the properties of the American Steel Hoop Co. At a meeting to be held Thursday of this week at Jersey City the American Steel Hoop Co. will formally decide to lease its properties to the Carnegie Steel Co. On the same day the National Steel Co. will take similar action. All of the offices in New York of the American Steel Hoop Co. will be removed to Pittsburg. The operating departments of the Carnegie Steel Co., National Steel Co. and American Steel Hoop Co. and their respective sales departments will be combined as far as possible.

These steps are in line with the announcement made in the beginning by President Schwab, that economies in selling and in administration would be introduced as rapidly as possible. The first move in this direction was the appointment of sales agents of the Carnegie Steel Co. to be sales agents of the Illinois Steel Co. However, sales are all made in the name of the Illinois Steel Co. It is arranged that after July 1 all sales of National Steel Co. and American Steel Hoop Co. products will be made in the name of the Carnegie Steel Co. This means that the services of a considerable number of salesmen will be dispensed with. On July 1 such of the officers of the National Steel Co. and the American Steel Hoop Co., now in New York, as are to be retained by the Carnegie Steel Co. will remove to Pittsburg.

It is reported, but without official confirmation, that the American Sheet Steel Co. may be taken over by another constituent company. The probability is, if any change is made, that this company and the American Tin Plate Co. will be operated together, both as to management and sales.

United States Steel and West Virginia Coal.

The United States Steel Corporation is said to be negotiating for the purchase of the Flat Top Coal Land Association properties in the Pocahontas field in West Virginia. A tract of about 232,000 acres is involved. E. W. Clark, of Philadelphia, president of the Flat Top Association, says that a 60-day option has been secured by New York parties, who, he understands, represent the steel trust. The price agreed upon is $10,000,000.

The W. Dewees Wood plant of the American Sheet Steel Co. at McKeesport, Pa., was shut down this week for repairs. It is probable that the plant will be idle for about a month. Heretofore the plant has been shut down on July 1.

The scope of the United States Oil & Gas Well Supply Co., Pittsburg, Pa., which began business on April 1 with a nominal capital of $25,000 is to be greatly enlarged by the absorption of a number of gas and oil well supply manufacturing plants. Since the incorporation of the company the capital stock has been increased to $400,000 and it is probable that this will be further increased to $1,000,000. The Trainer Supply Co. of Salem, W. Va., has already been taken over by the new company and it will also probably handle the output of the Eastern Tube Co., whose plant is now in course of erection at Zanesville, O. The United States company already owns and operates the foundry department of the Gowanda Agricultural Works, Gowanda, N. Y., and the Leidecker Tool Co., with works at Marietta, O., Sistersville, Mannington and Salem, W. Va., is an affiliated concern.

B. F. Jennings, who formerly owned the Leechburg sheet steel plant which was absorbed by the American Sheet Steel Co., will shortly commence the erection of a large sheet mill at Beaver Falls, Pa. An application for a Pennsylvania charter for the company was made about ten days ago, with a nominal capitalization of $1,000. This will be later increased to $500,000. Mr. Jennings will be president and general manager of the company. The number of mills to be installed in the plant has not yet been decided upon.

Grand Duke Alexander of Russia has ordered by cable through the Export Shipping Co., of New York, two acetylene gas search lights from the Riverside Light Co. of Buffalo, N. Y., to be shipped to Sebastopol for his 32-ft. launch.

REMARKABLE IMPROMPTU TORSION TEST.

The photograph reproduced herewith, is of a cast steel rod mill spindle that was broken in service. Owing to some obstruction in the rolls they failed to revolve holding one end of the spindle while the other end was turned two and one-half times by the engines before the spindle broke.

The parting line in the mold, which shows in the casting, was straight and parallel to the axis of the spindle. Before taking the photograph the parting line was marked with chalk so that it would show up the more plainly, and the result of this wonderful torsion test can be seen in the spiral caused by the twisting of the casting two and one-half times. This is one of the most notable tests yet reported and shows a remarkable piece of steel. In the casting of this spindle no special efforts were made to attain results by means of a special mixture.

For the accompanying photograph we are indebted to the Pittsburg Steel Foundry Co., whose plant is located at Glassport, Pa., and who cast the spindle.

SPECIFICATIONS FOR STEEL RAILS.*

BY WM. R. WEBSTER.

W. R. Webster, Philadelphia, Pa.: The analyses and tests referred to by Sir Lowthian Bell as comprising material from which he "could prove, and disprove, everything that could be said for or against any composition of a rail," are, no doubt, similar to those embraced in many of the records which we have in this country. The fact that the chemical composition of some of the rails is not in accord with the physical tests could be accounted for in many cases, if we had a full history of the manufacture of the blows of steel in question. In other words, the heat-treatment of the steel has not been recorded; and the chemical composition alone will not account for all the differences in results observed in the tests made or in the behavior of the rails in use. For instance, a rail of inferior chemical composition, finished in rolling at the proper temperature, will give better results than a rail of good chemical composition, finished in rolling at too high a temperature. Again, two rails of equally good chemical composition, one high, and the other low, in carbon, but both finished in rolling at the same temperature, may give very different results in service, or under the drop-test. If the finishing-temperature was right for the low-carbon rail, it may have been too high for the high-carbon steel, and thus may have given in that case a poor rail. Notwithstanding these differences, all will agree that, to make the safest and most durable rail, we must start with a uniform steel of good chemical composition, and roll it under the proper conditions of heating, reduction and finishing-temperature.

The section of the rail has a direct bearing on the finishing-temperature, because the large mass of metal in the head carries the heat much longer than the thinner flanges and web. I have for some time past advocated putting more metal in the flanges and web of our heavy rails, in order to retain the heat, and allow the work of rolling to be done on the head at a temperature low enough to break up the coarse grain, and produce a tough structure.

Another important point to be considered is the proper amount of carbon required in different sections of rails to produce the best results. It is generally admitted that steel containing a moderate amount of carbon, and receiving enough mechanical work at a low temperature to produce toughness and hardness, will give better results than higher-carbon steel, finished in rolling at a higher temperature. The latter method is often used, without fully appreciating the trouble which may follow as a consequence. With increase of carbon, the danger of producing a large grain in the steel by finishing at a high temperature is greatly augmented. This fact, in connection with the large mass of metal in the head, and the much smaller mass in the thin flanges and web, makes the manufacture a difficult one; and it is not surprising that rails rolled under these conditions do not always give satisfactory results.

Again, it is important to have a satisfactory check on the finishing-temperature of the rails. It is not of much use to say that the rails must be finished at a "dull-red" or any other particular color. Opinions may differ as to the exact hue of "dull red;" and in the day-time it certainly looks very different from the way it looks at night. The best check we have, I think, is a simple one which I have advocated for some time, namely, the amount of shrinkage that takes place in a 30-ft. rail from the time it is cut by the hot-saw until it has cooled to the normal atmospheric temperature. Just how many inches it is proper to allow can be easily decided by experiment, and introduced into the specifications.

The structure produced by too high a finishing temperature is not thoroughly understood; and the drop-test has not been recognized as the most important check upon it which we possess. This test is somewhat crude in one sense; but in another respect it is more valuable than a tension-test, particularly on material that has been finished at too high a temperature in rolling. A drop- or shock-test will develop brittleness in cases where a fair elongation may be given under the slow pull of the testing-machine. In my judgment, a drop-test should be made on every blow of steel, since it is the most satisfactory test we have for determining the quality of the finished rail, and will expose brittleness, due either to inferior chemical composition or to improper heat-treatment.

FIG. 1.—REMARKABLE RESISTANCE OF A CAST STEEL SPINDLE UNDER TORSION.

The Carnegie Steel Co., by their new method of rolling, are finishing their rails at a lower temperature than formerly, and are getting better results from the same section of rail with steel of the same chemical composition.

Some years ago, investigators of the relations between the chemical composition and the physical properties of soft steel became discouraged, and gave the problem up, because the results were so conflicting. This problem is now better understood; allowances are made in the physical requirements for material rolled into different thicknesses; and the finishing-temperature is carefully controlled. From the chemical composition of the steel, the tensile strength of the finished product is predicted; and the steel is rolled into finished forms without losing the initial casting-temperature. With regard to rail-steel, we have the same problem before us, only in some respects more difficult, by reason of the sections to be rolled and the higher-carbon steel to be used.

I would propose for further discussion the points above mentioned, namely:

1. The advantages to be gained by using more metal in the flanges and web of the heavier sections of rails.
2. The advantages and disadvantages of using a higher carbon steel than that called for in the specifications under consideration in this discussion.
3. The amount of shrinkage in a 30-ft. rail, to be specified as an accurate check on the finishing-temperature in rolling.
4. The advisability of requiring a drop-test on each blow of steel.

I appreciate that it is not only the finishing-temperature which must be considered, but that sufficient work must be put on the steel at a temperature low enough to break up the coarse structure and produce the tough steel desired. This is recognized by some who are rolling rails direct from the ingot; and they claim that better results are produced by this method than by re-heating the bloom. This might be considered another point for discussion.

*Continuation of the discussion at the Richmond meeting of the American Institute of Mining Engineers.

RELATION OF LABORATORY AND FOUNDRY.*

BY PERCY LONGMUIR, SHEFFIELD, ENG.

The question of chemical analysis and the advisability of mixing iron or other metals on the result of such analysis is one of keen interest to founders, and one that will profit greatly from a free discussion and interchange of opinion. In most of our industries, practice or rule of thumb has preceded science, and especially is this the case with foundry work. No one can gainsay the good and in many cases excellent work done by these methods. Our thoughts immediately turn to the early days of founding, and we are compelled to admire the splendid examples of such castings, and, at the same time to wonder how they were produced with the appliances then at hand. May not our successors, a few generations hence, have the same thoughts concerning us and our methods? It is easy prophecy to assert that by that time laboratories will be regarded as a necessary part of foundry equipment.

In steel works practice of today the chemical laboratory is recognized as an absolute necessity. Complete analyses of each open-hearth cast or Bessemer blow are taken. The advantage of chemical analysis in the case of open-hearth steel is most apparent, for by its aid any temper of steel can be produced, and the furnace held in perfect control. This is more readily grasped when we realize that a sample can be taken from the furnace, drilled when cold and analyzed for carbon by the Eggerts' test in something under 15 minutes. This test is naturally rapidly performed, but it does not follow that rapidity involves inaccuracy, for in good furnace practice the carbons in the resulting ingots or castings are found to come out correctly with almost unfailing regularity. It must also be remembered that these steels are produced within 1-10 of 1 per cent the requisite carbon content. But the efficiency of a steel works laboratory does not end with the conduction of complete analyses of each furnace heat or the estimation of combined carbon in furnace samples. All raw materials, furnace bricks or linings, fuels—solid and gaseous—iron ores, pig irons, etc., are subjected to a vigorous chemical examination which determines their suitability or otherwise for the purpose intended.

The acknowledged success of the steel works laboratory has caused many foundries to view chemical analysis as a means of controlling and regulating their mixtures and many foundries have adopted this plan with more or less success. In the older days mixing iron by fracture only met with a much larger measure of success than is possible today. The brands of iron, mostly charcoal, were fewer and they did not vary to the same extent as those the founder of today is compelled to use. Today the founder controlled by competition must utilize much cheaper irons, and this same factor compels him to turn out a casting equal in every respect to one made from a mixture of charcoal and cold blast irons. To do this by fracture only is out of the question. The deceptiveness of a fracture has been shown by many writers, and it is well known that its appearance is influenced by the rate of cooling and also the initial temperature of the iron. Further than this the same grade number of iron from different furnaces will only, in rare instances, have similar chemical or physical properties, and hence mixing by the grade number only is impracticable. There are two courses still open, and these are mixing on the results of: (1) chemical analysis; (2) physical tests. A series of the latter can be readily conducted in any foundry, much valuable information derived therefrom and a methodical plan of mixing adopted. No matter how ingenious this system be, it still leaves much to be desired, and it is only in a combination of physical and chemical analysis that full information of the characteristics of a metal will be gained. It is to this combination that the founder of today must turn and in it will find many scientific "short cuts" to that excellence of product which means full employment and fair dividends.

The routine work of a foundry laboratory comprises the analysis of every new batch of iron, the results of which are handed on to the foundry manager, who calculates his mixtures from these results. Complete analyses are necessary; that is to say, estimations of combined carbon, graphite, silicon, manganese, sulphur, and phosphorus. With a laboratory at hand, all iron should be bought to specification and on conditions that if certain elements exceed or do not reach a certain percentage, the shipment is liable to rejection. Each founder must, of course, make these specifications cover his own requirements. The metallic alloys in use in the foundry are bought in the same manner and checked by the chemist. These include ferro-manganese, speigel, aluminum, ferro-aluminum, ferro-tungsten, ferro-nickel, etc. If a brass foundry is attached to the establishment further duties for the laboratory include the analysis of copper, tin, zinc, and the various alloys and deoxidisers in use as phosphor-copper, phosphor-tin, cupro-manganese, etc. Foundry materials, such as blackenings, plumbago, etc., sands, clays, fire bricks and ganisters are examined for impurities, or in the case of facing adulterations. Fuels are examined and particular reference paid to the amounts of sulphur and ash.

The conduction of mechanical tests should come under the chemist's supervision. With cast iron these are generally limited to transverse tests, but a strong plea might be held for more tensiles, and the writer would suggest that such a test accompany each transverse test made. It is true that most of the strains cast iron has to meet in actual working life are transverse ones, and also that this test is easily performed, but if a testing machine be at hand, a tensile test will be readily performed, the expense trifling, and the gain in information great.

Physical tests of contraction, crooks, fluidity and chill made in the foundry are reported and tabulated by the chemist. In this correlation of chemical, mechanical and physical properties, lies the true secret of a perfect mastery of the mixing and melting of iron or any alloy. The results of the chemist's work, correlated and tabulated are kept in such a manner as to give any desired information at a moment's notice. In the case of abnormal results the microscope reveals much information as to crystalline structure. Metals or alloys of high electrical conductivity are in request and a combination of chemical and microscopical analysis will show the path to success in this direction. This leads to the matter of experimental work, and it is hardly necessary before an association of founders to lay a plea for original research. It is a difficult matter to specify the probable results of such work, but in the first place no financial loss accrues, light is thrown on dark subjects, and paying specialties or novelties are found.

The conservative element is strong in many foundries and this accounts for much of the opposition laboratories have to meet. Changes which appear at all revolutionary are looked at with askance. The matter is not one of expediency, but rather an indifference to change from the customs bequeathed by our ancestors. In other respects foundry work is looked upon as "no class," that is as being inferior to and requiring the exercise of less judgment than other branches of the engineering profession. In a case of this kind the laboratory is regarded as being "too academic," and as having the tendency to lift the foundryman from his natural rut and place him on a plane nature never intended him to occupy. Criticisms of this kind generally emanate from a source where the idea of molding is that of ramming sand, and of melting that of throwing pig and coke into a furnace and drawing off the liquid iron from the bottom.

Many are skeptical as to the value of a laboratroy and argue that there is no return for the money invested, or, in short, that the laboratory is a mere scientific "fad." We will take an example from the brass foundry first. Assuming that our imaginary brass foundry purchases 30 tons of copper per month, what guarantee has the purchaser—further than the brand—of its purity? Suppose this copper to contain 1½ per cent of zinc, how many fracture experts would detect it? It will not seriously affect the castings, but it makes a difference elsewhere. The yearly purchase of copper will be 360 tons, representing, at $370 per ton, $133,200. But this copper is associated with 1½ per cent zinc, and the cost of zinc is about $90 per ton; 1½ per cent of 360 tons represents 5.4 tons, which should have cost $426, but for which were paid $1,998, an excess of $1,512.

This illustration is a fictitious one, and may be slightly overdrawn, but it points a moral. Chemical analysis would, in this case, save the founder over $1,500, and he can add all the zinc

* Read at the Buffalo meeting (June 4-6) of the American Foundrymen's Association.

necessary himself. It is well known that some varieties of copper will carry more zinc than others; that is to say, will not show it in color so readily, and in this respect chemical analysis would doubtless yield some information.

Another example may be quoted, and this is an actual one. A reverberatory furnace and a length of underground flue were built and no advice sought on the simple matter of brick. The design of the furnace was bad, but the bricks were worse—they were made of the commonest of clay, and the flue built of ordinary red brick. The bricks softened and formed a good slag at the working temperature of the furnace and needless to say the life of that furnace was not very long. An analysis of these bricks for lime work, potash and soda would have saved much loss and demonstrated most forcibly the utility of chemical analysis.

An inquiry appeared recently in one of the technical magazines for a suitable varnish or coating to paint the interiors of iron castings in order to make them meet a certain hydraulic pressure, which, by the way, was not at all high. The aid of chemical analysis should have been called in in this case, and the composition of the iron adjusted until the castings would meet the requisite pressure without leaking. Instances of a similar nature to the three already given can be multiplied, showing the financial gain or rather the prevention of financial loss due to the laboratory, and proving that the money sunk in such an institution is not by any means so unremunerative as many appear to think.

An objection often raised against chemical analysis is that the results are not reliable and that no two chemists return concordant analyses of the same sample. There may be more or less truth in this, but it must be remembered that drillings for analysis are often submitted in a careless manner, and many cases of varying results from different chemists can be traced to this cause. The importance of correct and uniform sampling cannot be too forcibly maintained. Cases have occurred in which drilling taken from opposite ends of a pig or even from different pigs have been sent to different analysts and the results expected to coincide. On the other hand few chemists realize their own "personal equation," and most of them have their own standards or methods. There are many inherent difficulties in the laboratory which contribute their quota to the chemist's troubles, and which, perhaps, are hardly realized by outsiders. The work of this association will do much toward alleviating and removing these troubles, and it is hardly necessary on this occasion to refer to the work of the standardization committee. The writer will venture to say that this committee, by supplying reliable standards, in addition to the great boon conferred on chemists will do more to favor the introduction of the laboratory into the foundry and to establish a firm confidence in chemical analysis than any amount of papers or discussions.

It is urged that many iron castings meet all requirements if they are true to pattern, clean and solid. This may be true of a sash weight, but it is not by any means the case with castings for engine details machine framings, hydraulic or steam purposes, nor yet with structural castings. Other properties are requisite in these cases and in this competitive age the founder's aim is to meet these requirements without recourse to expensive brands of iron. The laboratory offers a solution of this and similar problems, by means of this establishment the founder is enabled to meet any requirements in his castings in the most economical manner.

The direct outcome of the laboratory will be the abolition of rule of thumb methods in mixing metals, it will replace these with scientific and exact ones and set the art of mixing and melting on a higher and more stable plane. The days of special fluxes, fakes and nostrums of various kinds are surely drawing to a close and what we need in this 20th century is clear light with definite and exact methods. There is no flux known that will remove the uncertainty of foundry work. Chemical and physical analysis do not accomplish this either, but by their aid many risks are removed, suitable metals are ensured in the various qualities of casting, and they tend to keep things in the foundry ever on the upward trend.

The founder of today who would turn out his castings of one uniform standard of excellence must, of necessity, put himself in a condition to profit from the results of chemical and mechanical analysis. A chemical analysis, tensile or transverse, test, contraction, warping or fluidity tests must not represent so much Greek, but rather should give exact information and enable the founder at once to determine the suitability and extent to which the metal giving such tests may be beneficially used. The founder with such information at his finger ends, and the ability to use it need fear no rival, he has reduced his business from one of uncertainty to a scientific exactitude that can face all competition in that respect.

The success of a laboratory in any large foundry is assured, and if the output of a foundry be too small to warrant the retention of a chemist, recourse may be had to outside analysts, and all physical tests can be readily conducted in the foundry with comparatively little outlay and the existing personnel.

The future of all foundry work depends upon the development of scientific methods, and from the foothold these methods have already obtained we see the dawn of an era which will be distinguished by the great advance of the whole foundry industry.

Good Exports of Wrought Pipe and Wire.

The foreign shipments of the National Tube Co. during the month of May aggregated 6,000 tons, exceeding all previous records and twice as large as any month's shipments thus far this year. One of the largest single shipments made by the company to a foreign port consisted of 3,000 tons of 4-inch wrought iron pipe which was sent to the Dutch East Indies. A shipment consisting of 1,132 tons was also sent to Brazil during the month. The pipe exported to Europe aggregated 1,166 tons while the Australian shipments amounted to 177 tons. Mexico received two consignments of pipe amounting to 267 tons while small shipments were made to Japan and Africa. The foreign shipments of the American Steel & Wire Co. during the month aggregated nearly 4,000 tons. To South America 13 consignments were made representing a tonnage of 1,093. Australia received 785 tons while the wire consignments to Continental Europe amounted to 481 tons. South Africa and Japan were also large buyers of wire and wire nails. The total consignments of wire nails amounted to 906 tons.

Tin Plate Exports and Imports.

Figures that will be issued by the Bureau of Statistics in July on the exports and imports of tin plate for the year ending June 30, 1901, will show a heavy increase in the export tin plate trade over previous years. For the ten months ending April last the exports of tin plate amounted to 1,306,100 pounds, as compared with 183,955 and 275,990 pounds exported, respectively, in the first 10 months of 1899 and 1900. That the exports for the current fiscal year will reach more than 1,500,000 pounds is already assured.

The imports on the other hand are showing a decrease from those of the previous year and it is not probable, in view of the high ruling price of tin plate abroad that the imports this year will amount to more than 115,000,000 pounds.

According to present arrangements the Bessemer plant of the Republic Iron & Steel Co., at Youngstown, O., will be shut down the greater part of July. A new blooming mill engine, which is now being built by the William Tod Co., will be installed and the two eight-ton converters will be replaced by ten-ton converters. It is now announced that there will be four stands in the new bar and billet mill of the Republic Iron & Steel Co., at Youngstown, instead of two as planned.

The Russell, Burdsall & Ward Bolt & Nut Co. is the name of a new company which has been formed in Westchester county, N. Y., for the manufacture and sale of bolts, nuts, rivets, washers and screws. Capital is fixed at $2,000,000. Two companies are combined to make the new one. The directors are Richard H. Burdsall, Ellwood Burdsall, Samuel Comly, Walter S. Comly, W. L. Ward, Howard E. Marshall, Samuel N. Lefevre and Joseph H. Marshall, of Port Chester, and Robert W. Parsons, of this city.

SELECTION OF A STEAM BOILER.

At the regular monthly meeting of the Engineers' Society of Western Pennsylvania held at Pittsburg, Tuesday evening, June 18, a paper on "The Selection of a Steam Boiler" was read by W. E. Snyder. The paper was long and treated the subject comprehensively. The writer severely took to task the purchasers of steam boilers who select them as they would any ordinary commercial commodity, considering a low price one of the most important requisites. Mr. Snyder argued in favor of having a power plant erected by a competent engineer and said that the cost of the boiler should be one of the last matters considered when the installation of a boiler plant is to be made.

At a meeting of the society last fall, Mr. Snyder read a paper on the proper selection and construction of the furnace and at that time he promised to prepare a paper later on the boiler, which he said was the second step in the conversion of the latent heat of fuel into power. He said that he took for his subject the selection of the steam boiler because he believes that it is the most important step in the erection of a power plant, as proper selection with reference to the work to be accomplished will be of more value than any amount of care that can be bestowed upon the boiler after its installation. Continuing, the writer said in part:

"It is a fact to be deplored that astute business men buy boilers like soap, the price only entering into their selection, and the first cost of the boiler in consequence is small in comparison with the cost of repairs and loss of heat and power afterwards as a result of this poor selection. The one who makes the final choice of the boiler should have a scientific knowledge of the subject, but unfortunately there is little of value published. The writer has no desire to condemn scientific investigation of mathematical demonstration, as these are very necessary in their place, but when one sees a boiler with the insides covered with scale and the tubes choked up, he realizes that these are conditions to be faced which are wholly apart from and beyond the guidance which the strictly scientific and mathematical research will furnish to the person who is to select the boiler. Any construction which results in such conditions in actual practice destroys the value of the boiler shown by theory.

"What has been said with reference to the astute business or unprofessional man may also in a measure apply to the professional man or the so-called mechanical engineer. The writer has known young men posing as engineers even before they have been graduated from school and as the result of the work done by many of these inexperienced young men whose knowledge consists of the theories that they have gleaned from books almost wholly, the profession to an extent has fallen into disrepute. The engineer to be competent to select a boiler must study up the points for himself which have not even been touched upon in scientific research.

"When the question of the selection of the boiler comes up for consideration it should be realized that the boiler is the heart of the plant and that it may make or lose a fortune for the owner in its lifetime. The selection, construction and erection should be left entirely to a competent engineer and there are many who have spent almost their entire lifetime in connection with steam boilers. Engineers whose experience has been confined to the office only can look over plans and may be competent to pick out points that might cause trouble, but the engineer who has been connected with the actual operation of steam boilers is the one who can positively say what things will give trouble and can give many suggestions which will be of inestimable value in overcoming features which have caused trouble in the past and which will give trouble in the future if their incorporation be continued."

The author then at length touched upon the selection of the boiler from the boiler manufacturer's point of view. The latter he stated will naturally be averse to calling an outsider into consultation for the selection of a boiler, arguing that his type of a boiler has given great satisfaction from the large number in use and he further argues that in his standard he has incorporated the best features to be found in boiler construction. That more progress in design is required in boiler construction is evident from the fact that despite the almost universal use of water-tube boilers for marine work, marine engineers declare that the water tube boiler as at present constructed is not the best type, while on land engineers have many points to bring against both general types of boilers. The writer said that the standards of the manufacturers are by no means due to the limit of progress, as there has been little change in the types of boilers known as standards within the past ten years. The real trouble he said was due to the fact that little good engineering talent has been employed in the past in the erection of boilers, all of which makes the employment of a competent engineer by the purchaser the more emphatic.

The writer said that he did not wish to be unfair to the boiler manufacturers, but insisted that if they build boilers that cannot be kept clean they should invent and manufacture machines that can keep them clean. "When the boiler builder is approached about the incorporation for some advanced feature in his boiler," continued Mr. Snyder, "he will gravely tell you that competition is so keen that he must by all means keep down the cost of manufacture, but nevertheless the suggestion will be received and will be referred to his chief engineer, who in many cases has been found to be an ordinary draughtsman. For this same reason competent engineering talent is also not employed. Price should be a secondary consideration by all boiler manufacturers and also purchasers. Each type of boiler has some defects which should be eliminated as far as possible by the manufacturers.

"There are five points to be investigated in the selection of a boiler. I will consider them in the following order: First, safety; second, convenience of operation; third, efficiency as a steam generator; fourth, durability, and fifth, cost.

"The point of safety all will admit should be considered first. A boiler under steam is a thing of awe, but there are many who have had charge of boilers and have had no explosion that are led to believe that such things are impossible and such familiarity breeds contempt. That there are many such men in charge of boilers is evident from the loss of life and waste of property as the result of explosions every year."

The inspection of boilers was next considered and thoroughly discussed. Boiler inspections by the government, the writer held, were too far apart, generally a year, and owing to the pernicious influence of politics oftentimes men are appointed boiler inspectors who are wholly incompetent, and the boiler owner, after receiving a certificate of inspection from the government inspector, is deluded into a false position of safety. Inspectors should not be appointed for their ability to control votes but should be compelled to pass an examination and the applicant receiving the highest average should be appointed to the position. As the result of poor inspection, when a boiler explodes, the owner hides behind his certificate of legal inspection.

"Then the investigations following explosions are oftentimes farces. A coroner's jury sits on the case and invariably the verdict is brought in of 'low water.' It is a well-known fact to many engineers that such verdicts have been assigned as the causes of explosions when poor material, bad design and poor inspection were the real causes. The manufacturers must realize that boilers poorly attended and poorly inspected are bound to cause a loss of life and property sooner or later."

Statistics were then read showing that from 1879 to 1899 there were 5,199 boiler explosions in the United States, resulting in the death of 6,118 and the injury of 8,651 persons, "which proves only too fully that there should be better inspection, as the present method does not show up poor material, no matter how thorough the inspection be made."

"In selecting the boiler for safety, the physical and chemical properties should be specified and the plans should be carefully gone over for mechanical defects that would impair safety. The specifications of the United States government for marine boilers is a good standard to go by. According to many tests made it has been recommended that solid drawn steel tubes are more to be desired than lap welded tubes of iron or steel, and a nickel steel containing from 20 to 25 per cent of nickel is the best material of all. It is the rule rather than the exception for plates to be thinner at the edges than specified on account of the spring of the rolls, and plates have been found which were from 10 to 30 per cent less in thickness on the edges than along the center. Of course these were extreme cases but the rule should be to specify for plates as to thickness, 'measured on its thinnest edge.'

"We now come to the second point, convenience of operation. The convenience for operation, cleaning and repairs has been placed before the efficiency for steam generation, as the efficiency of the boiler as a steam generator is greatly reduced if it cannot be kept clean. The boiler must be kept clean both inside and outside, and the mud and scale must be kept from the tubes as no end of trouble is caused by their presence, to say nothing of the loss of heat. Soot, ashes and clinkers which gather on the outside of the boiler must be conveniently removed and the setting of the boiler should be so arranged as to give room for proper outside cleaning. The writer has seen water tube boilers where the space between the water tubes was choked completely. It is not usually convenient to wait until the boiler is cold before starting to clean or make repairs, as valuable time may be thus lost, and it should be possible to start some time before the setting is cold.

"Considering the third point, efficiency as a steam generator, the fundamental principle is the rate of heat transference from the hot gases to the water. The actual function of the boiler is to generate steam and every element of heating surface should be operative. It is assumed and correctly, that the rate of flow of heat is proportioned to the difference in temperature between the hot gases and the water, other things being equal, so that the rate of flow decreases towards the flue. It should be noted whether the baffle walls are likely to continue to perform their function indefinitely. The writer has seen cases where baffles had become practically inoperative and gases followed the path of least resistance. When the front baffle wall is broken down the front is doing less than intended and the back is doing more. Do not follow special trials, because in publishing such trials very important considerations are very often omitted. There may have been a special furnace or stoker which the manufacturer fails to mention, and without such appliance the performance of the boiler may not have been nearly so good. When a good trial is made, the furnace maker generally uses it as proving the superiority of his furnace, disregarding the boiler's part in the work entirely, while the boiler maker takes the same test and claims all the credit for his boiler, ignoring the part the furnace played. The principle of taking the evaporation per pound is a bad one, as it is impossible to estimate the exact condition of the fire before and after the test, so as to find out the exact amount of combustible employed, and it is almost equally difficult to determine the exact amount of water before and after the test. The water at the beginning of the test is probably swelled by bubbles to a greater extent than at the close of the trial, so that the amount of water at the start is often estimated too high. This latter point tends to make all tests present too favorable a showing. The published trials are often worse than useless, and it is not what can the boiler do under artificial conditions, but what can it do under normal conditions. Regarding the various types of boilers it may be said that no one boiler possesses all the advantages over all other types.

"Although a horse power involves theoretically the absorption of 33,317 British thermal units in one hour, one manufacturer will claim that the seven square feet of heating surface per horse power which he allows is equal to the 12 square feet which another allows. This is very misleading. There are natural laws which forbid the possibility of any such great range. The deception is all the worse because there is a misleading element of truth. In calling for bids it should be required of the maker to specify the number of square feet of heating surface per rated horse power and the total number of square feet. The makers who allow a small number of square feet per horse power of course claim that they have better circulation of gases in the furnace and the water in the boiler. There is something in this, as the boilers with the small area really have very good internal circulation, but the claims for circulation of the hot gases are usually overdrawn.

"There was a competitive test once made between two boilers, each rated at 300-h. p., the one having 7½ square feet of heating surface per horse power and the second 11 square feet. The maker of the first boiler agreed to make certain forfeits in case his boiler showed the poorer performance, rated at so much per horse power, in proportion to the difference, and he lost. His boiler developed 500-h. p. against 568-h. p. of that of his competitor. It exceeded its rated capacity by 67 per cent against 89 per cent for the other. It showed 4.48 square feet heating surface per horse power as compared with 5.67 square feet for the other, showing a rate of heat transference per square foot per hour of 7,466, British Thermal Units, against 5,871, British Thermal Units. While the results shown were better than in the larger boiler, they were not better in nearly the proportion claimed, namely 7½ to 11. The temperature of the gases in the stack was 573 degrees for the smaller boiler and 666 degrees for the larger boiler.

"Some years ago some English engineers advanced the theory that the circulation of water in a boiler is at least unnecessary and possibly actually deleterious. This theory has since been exploded. The circulation is desirable because it permits the steam to separate itself from the water more readily. Some builders of vertical boilers have had to put outside pipes on their boilers to permit circulation by the water flowing down them. There is generally too much attention given to the matter of dry steam, as a matter of fact it is usually dry. In 1,200 tests it was found that there was not over 2 per cent of moisture in the steam on the average. The writer found a case where it was reported that the steam contained 8 per cent of moisture, but upon investigation it contained only one-half per cent. It proved, however, that the engineer was incompetent when he reported having found 8 per cent.

"The advantage of superheating steam lies largely in the fact that it furnishes a means of utilizing heat which would otherwise go up the stack. Thus there is positive economy irrespective of preventing moisture in the steam. Too much has been said of the danger to the plates from having steam on one side and hot gas on the other. The writer knows of a case where for years there were gases ranging from 1,000 degrees to 1,400 degrees against plates, with steam on the other side and the plates were not damaged.

"The admission of feed water is an important one. The feed water should attain the boiler temperature before entering the boiler, as cooler water striking the hot plates will damage the boiler. Also, the water should be admitted in such a way as to assist in the circulation. It is impossible of course to maintain the feed water at exactly the boiler temperature, but this condition is striven for. Cases are known where the plates required frequent repairs, but when the feed water was made hot enough they lasted very well. The conditions are the same in water tube boilers but in a less degree.

"We now come to the fourth point, the durability of the boiler. The durability of the boiler is dependent upon the conditions under which it operates. In the case of a water tube boiler, where bad water is used and it is difficult to clean the tubes, new tubes must be put into the boiler every few years, while in the case of the two flue boiler, where the tubes can be cleaned more readily the tubes will last longer. The use of boilers is much the same as the use of other machinery. By new inventions types of boilers, the same as machinery, become obsolete, and while they are still in condition for operation after years of use the newer types are more desirable and the older makes grow proportionately more undesirable.

"The cost is the last point to be considered, but by many business men it is the first point considered in the selection of a boiler. In this connection I again argue in favor of allowing the engineer predominance in the selection of a boiler, and while cost is the last consideration, if a boiler is so selected the saving in repairs in the life of the boiler, to say nothing of the saving of time while these repairs are made, will more than equal the first increased cost. My whole argument has been devoted to proving the necessities of employing engineering talent from the inception of the plant to its completion."

In the discussion that followed the point was brought out that pure water should be taken into the boiler, thus precluding the necessity of removing mud and scale that deposits itself from the use of dirty and impure water full of organic and inorganic matter. It was stated that a number of successful filter systems are now on the market which remove nearly all the scale forming properties from the water before entering the boiler and as a result repairs and the necessity of cleaning are reduced to a minimum.

SPECIAL BORING AND FACING MACHINE.*

BY WALTER S. RUSSEL, DETROIT, MICH.

The first illustration accompanying this paper presents a tool gotten up by the writer to meet a special emergency. It is really a portable machine, simply resting upon the floor of the shop, with a slight excavation below for the driving-shaft and pulleys. The cylinder, shown in Fig. 1 with the machine, and one of whose flanges has just been finished, is 13 feet in diameter, and 3½ feet high, and weighs 3½ tons. The flange surface is 4½ inches wide. The mill, with its four cutters, finished this surface, clearing away ¼-inch in depth, to insure a good surface, in slightly over two hours. An internal flange about half way down the cylinder is also faced by blocking up the casting, from the bed-plate of the machine, instead of clamping it directly to the bed-plate, as shown in the cut. The mill is made up of a cylinder, on which is mounted a revolving plate holding four cutting-heads. The upper edge of the cylinder, concealed from view in cut, projects inward to form a flange, the lower edge projects inwards also to form seats for the brackets of the driving mechanism, and outwards to form a base to which castings to be finished are secured.

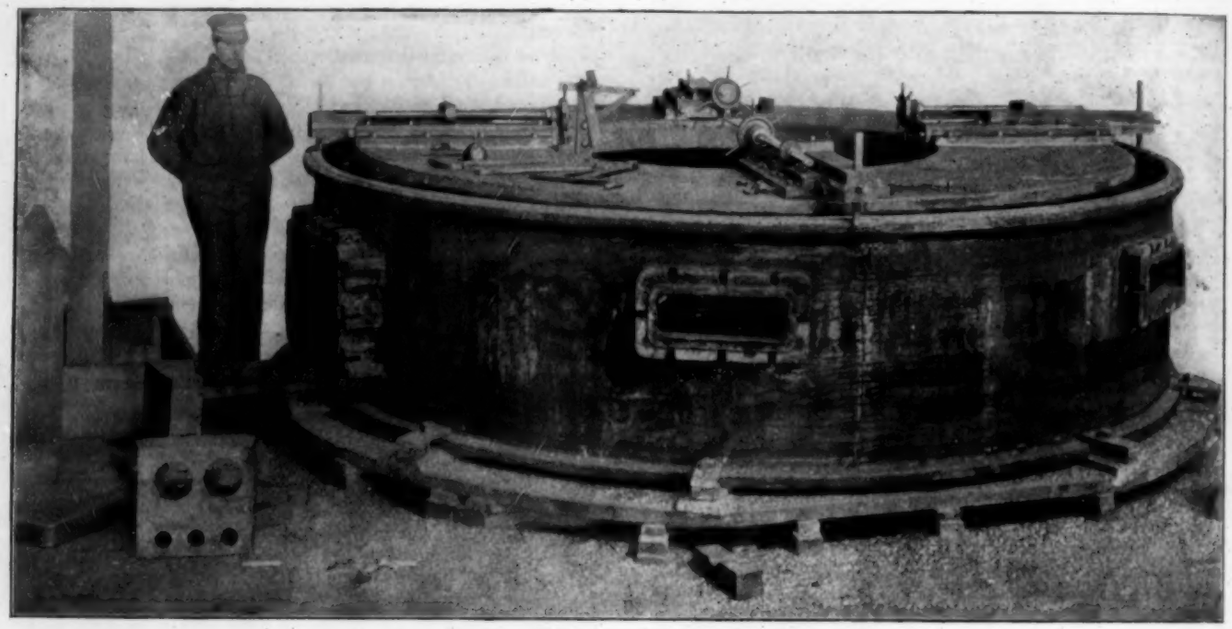


FIG. 1.—SPECIAL FORM OF BORING AND FACING MACHINE.

The absolute necessity for an extra machine to do this class of work, due to the fact that our foundry had gotten ahead of the machine-shop in the progress of manufacture of a lot of this large cylinder work, was the excuse for the conception of this machine, when it became known that a mill which could do this work could not possibly be obtained within several months. The drawing for the machine was made, and given to the pattern-maker on Nov. 16. On Dec. 15, 25 working days after, the first casting was placed on the machine, and with only two cutters the first flange was finished in three hours. The complete machine weighs 34,000 pounds, and costs $1,300. As said above, it is portable, and can be rolled into a corner or outside of the shop, if not used.

At first glance, the range of work seems limited, but the cutting heads shown on the plate can be removed and fastened to brackets properly fitted to the vertical cylinder of the machine, and the castings to be machined secured to the revolving plate, giving a possible great variety of work. Again, a bridge, holding the tool, supported on legs and secured to the main frame at a moderate expense, will make a rough but very powerful tool for large work. Fig. 2 shows one of the cylinders which was finished on this mill, and its cover, loaded on a specially constructed car, as the diameter of the castings would not allow of their transportation on an ordinary flat car.

* Read at the Milwaukee meeting (May, 1901) of the American Society of Mechanical Engineers.

THE GRADING OF PIG IRON.

TO THE EDITOR:

Regarding the method proposed by Mr. West at the recent meeting of the American Foundrymen's Association for grading pig iron by analysis, the following objections present themselves:

It would be found in practice that great difficulty would arise in checking the sulphur analysis within the narrow limits laid down by Mr. West. Rather than specify the sulphur between certain limits for certain grades, it will be found more practicable to specify the maximum limit for each different grade. My ideas as to a suitable method of grading pig iron by analysis would be somewhat after the following:

First, make special specifications for ferro-silicon, or so-called silvery iron, limiting the minimum in silicon to say 4 per cent sulphur, not to exceed .035. Now, inasmuch as some pig iron of this character is made with sulphur over .035, it will be necessary to establish an off grade, giving the silicon the same specifications, but allowing sulphur to be over .035.

It will be necessary to give separate specifications for charcoal and coke irons, as the charcoal irons are almost always lower in sulphur and silicon (with same carbon contents) than the coke irons. We will, however, disregard specifications for charcoal iron in this paper and confine ourselves to coke irons.

No. 1 coke iron is to be graded according to the per cent of silicon and sulphur, the silicon to range from a minimum of 3 per cent to a maximum of 4 per cent, sulphur not over .035. Now, inasmuch as pig iron with silicon ranging from 3 to 4 per cent is frequently made with sulphur over .035, provision should be made for this grade of iron, and it is proposed to call it No. 1 X, or off No. 1. Presumably the furnace men would prefer to call it No. 1 X. Regarding the matter of carbon, which we know has very much to do with the properties which the pig iron imparts to castings, it will only be necessary to say with No. 1 pig iron that the fracture shall be gray, and that in the No. 1 the grain shall be open. This will serve as a protection for the foundryman who has no chemist, as unless the foundryman has an analysis made of each carload of pig iron, he will have no means of judging, except by the furnace analysis, whether he is getting strictly No. 1 or off No. 1. We figure that the increase in sulphur will affect the grain and in this way reveal itself.

With the No. 1 foundry iron the matter of color and size of grain has much less influence than with the higher grades lower in silicon and higher in sulphur; still, it is well to take into account the matter of fracture as well as analysis, even with the No. 1 iron.

For No. 2 coke iron, we would suggest in a general way that the specifications call for silicon from 2 to 3 per cent sulphur not over .05, fracture of pig iron to be gray and open in grain. No. 2 X, or off No. 2, to have the same silicon limits, but with sulphur over .05; the fracture may show a close grain iron, but the color must be gray.

No. 3 coke iron shall have silicon between the limits of 1½ and 2 per cent, sulphur not over .05. No. 3 X, or off No. 3, same silicon as No. 3 straight, but sulphur over .05. Both grades of No. 3 must show a gray fracture in the pig.

No. 4 shall have silicon between the limits of 1 and 1½ per cent, sulphur not over .075. No. 4 X, or off No. 4, same silicon as No. 4, with sulphur over .075. The fracture of No. 4 straight must be gray and of No. 4 X it may be either gray or mottled.

No. 5 pig iron shall be between the limits of ½ to 1 per cent in silicon, and sulphur not to exceed .10. The fracture may be gray, mottled or white. No. 5 X, or off No. 5, same silicon as No. 5, with sulphur over .10, the fracture may be either gray, mottled or white.

No. 6 shall include all iron with silicon under ½ per cent, with sulphur not to exceed .10. No. 6 X, or off No. 6, same silicon as No. 6, but with sulphur over .10. The fracture of iron of this character will usually be mottled or white, although this is not always the case, and therefore, specifications for grade or fracture may cover gray, mottled or white, as required.

It may seem in the above that we have been too liberal in the matter of sulphur limits; however, it has been my experience that in the majority of cases when we come to investigate the matter of sulphur contents it is often found to be higher rather than lower than the analysis furnished; in other words, many chemists do not get all the sulphur in the pig iron, and for this reason, it would be a good thing if a standard method of sulphur analysis could be used in working on pig iron. There are some very good and reliable methods; there are others which are not to be relied upon, but owing to the ease with which they are carried out are much in use.

When a coke pig iron is reported with sulphur .01, it is safe in the majority of cases to have another analysis made by a different chemist, as such low sulphur in coke pig iron I do not believe to be in accordance with actual conditions except in isolated cases.

The sulphur in foundry iron is not always accountable for the bad results attributed to it; in other words, an infinitely small amount of sulphur is frequently held responsible for defects with which the suphur in the pig iron has had nothing whatever to do. When it is remembered that from one-third to one-half of the sulphur in the coke goes into the mixture during the process of melting, it would seem that more attention should be given to the important subject of sulphur in coke than it usually gets.

Regarding the necessity of taking into account the fracture in grading pig iron, it must be remembered that the color of the fracture and the size of the grain, other things being equal, that is to say, with same silicon, sulphur, etc., depend on the amount of total carbon, and inasmuch as the amount of total carbon in the pig iron cuts a very important figure in its adaptability to different classes of work, unless analyses are made and furnished with each carload of pig iron showing the per cent of the total carbon, it would seem to be necessary to take into account the fracture, and for this reason, we have included the matter of fracture together with the chemical specifications for sulphur and silicon.

The above plan is not supposed to be perfect by any means, and it is subject to criticism; however, it may serve as a basis to settle the important subject under discussion, of a practicable way of grading pig iron so that the method will be satisfactory to the seller as well as the buyer. In this matter it will not do to be too technical nor to specify impossibilities; the subject is a broad one and must be treated in a broad, liberal way.

The above specifications are intended for grading pig iron cast in sand molds. For sandless pig iron the same limits will answer for silicon and sulphur, but unless the total carbon is furnished also, the foundryman will have no means of judging the carbon contents, as the fracture reveals but little in sandless pig iron, except as between white iron and gray. Regarding maximum limits for sulphur in the off or X grades given above, this would seem to be best settled by special agreement between the seller and the buyer.

CHARLES H. VANNIER.

Chicago, June 17, 1901.

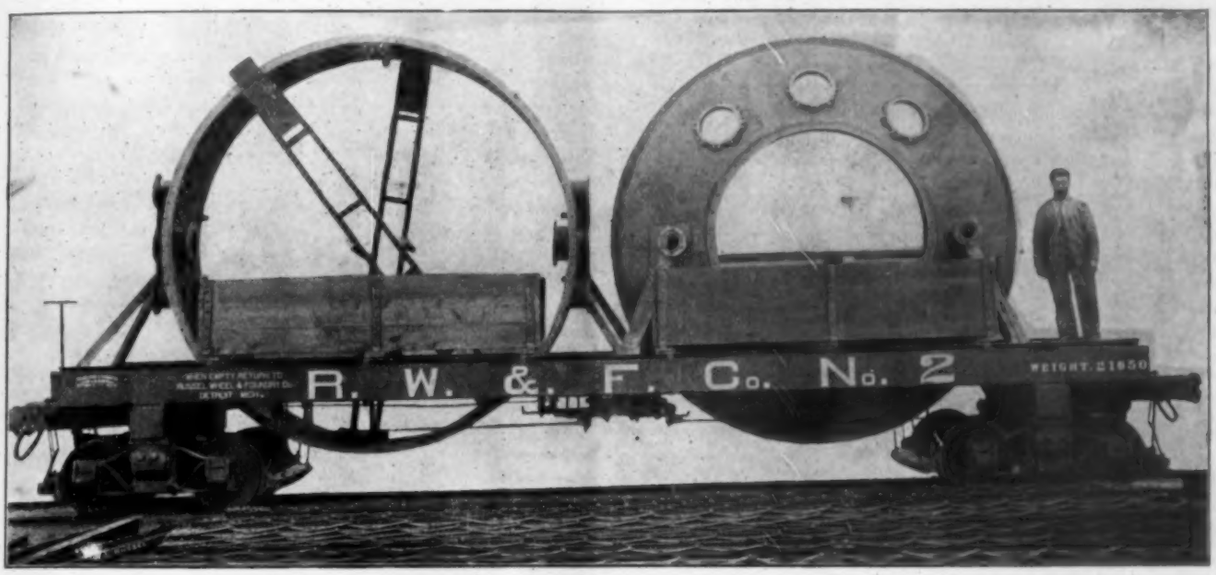


FIG 2.—CYLINDER FINISHED ON SPECIAL BORING MACHINE.

R. E. Ismond, who is chairman of the Real Estate Board, Chicago, sailed from New York June 22, for a visit to the manufacturing centers of Europe for the purpose of distributing information as to the advantages of Chicago as a manufacturing center. Elaborate maps have been prepared, as well as literature, setting forth explicitly and completely the advantages claimed for Chicago, and the real estate board is hopeful of satisfactory results.

The American Tin Plate Co. has purchased from the American Sheet Steel Co. the buildings and power plant of the Chester, W. Va., sheet mills, and according to reports will remove the Ellwood City, Pa., and Irondale, O., tin mills to that place. The sheet mill machinery has been removed from Chester to Vandergrift, Pa.

THE NATIONAL CASH REGISTER CO.'S METHODS.

F. A. Halsey, one of the editors of the *American Machinist*, writes as follows in the last issue of that paper:

It is always easy to be wise after the event, and perhaps what follows will be dismissed by many with that remark. Undoubtedly it cannot have the force that it would have had if written before the strike at the Dayton works, but, notwithstanding that fact, it is nevertheless true that I have not, and never have had any faith whatever in many of the efforts made by the National Cash Register Co. in the line of what has come to be called "social betterment."

It is impossible for anyone to doubt the high aims of the president of the company, Mr. Patterson, in doing as he has done, and all can, in a measure, realize the disappointment that must attend the outcome of so much well-meant effort. In view of it all we can understand that at the present moment "the heavens are brass" to him, and he certainly has my profound sympathy, not only for the business complications growing out of the strike, but still more for the disappointment that must attend the failure of plans into which he has thrown his whole heart and soul—a disappointment that must be all the more keen by reason of the apparent success of those plans, until recently, and the prominence which has been given to them because of this apparent success.

Belief in Mr. Patterson's entire sincerity and sympathy for him in his disappointment do not, however, change my belief that, as a means of improving the relations with his employes, a great part of his work is, and was bound to be, null, void and of no effect.

This belief is not based on the common and flippant remark that workmen "do not appreciate what is done for them," but on the fact that no one with a well developed sense of self-respect, whether workman or other employe, wants anything "done for him" by an employer beyond just treatment, the provision of a comfortable place wherein to work and payment for services rendered.

To avoid misunderstanding, it is advisable to say that I believe in clean, spacious, well-heated, well-lighted and otherwise well-ordered shops, with every reasonable appliance for the convenience and comfort of the workmen. I believe in the suggestion box and the complaint box and in payment for suggestions and ideas. I do not, however, believe in giving a few prizes for the best suggestions, and taking the others without payment. All ideas used should be paid for in accordance with their worth, the relation of the parties being simply that of buyer and seller. The very term, "prize," carries with it the idea of that most hateful word, gratuity.

I believe in provision for eating the noonday luncheon in comfort and am willing to admit the shop dining room with hot lunches supplied at cost, but not with lunches given away. I believe in these things because they are done primarily for the good of the business and not as a good will offering to the workmen. They conduce directly to good and economical work and they tend directly to assist in getting and keeping good men without any feature of patronage or paternalism. What I do not believe in is the flower gardens, the kindergarten, the library, the lecture course, the cooking school, the "rest room," etc.

In principle at least there is a sharp line of demarcation between these two lines of action by the management. One tends directly to more efficient production while the other is simply a good-will offering. A hot luncheon is a better foundation for an afternoon's work than a cold piece of pie. The kitchen and lunch room are thus justifiable, and similar justification exists for well-warmed and well-lighted shops, and for the other things approved above. A distinction may be drawn regarding the library. So far as it relates to the work in hand, it supplies information which tends to increase the efficiency of the workmen and its cost may thus be many times returned. To that extent it is justifiable, but in so far as it supplies mere "reading matter" it can produce no tangible return and is not justifiable.

The National Cash Register Co.'s business is generally understood to be highly profitable. This is as it should be. The company has done a public service in supplying these machines and it is entitled to its profits thereon. We all know, however, that workmen are not experienced in these matters. They know but little, because they have but little opportunity for learning, of the magnitude of manufacturing and selling expenses, and they uniformly overestimate the extent of the profits made. In my opinion these outside enterprises of Mr. Patterson's have simply confirmed these exaggerated impressions. His workmen have seen him spend large sums in directions that produced no tangible returns, and such expenditures have strengthened their feeling that the company is "rich" and they have asked: "If it has money to spend in such ways, why is it not able to raise wages or shorten hours of labor?" In other words, these very expenditures, instead of leading to a spirit of content, have led to discontent.

This brings us to the crux of the whole question. In this world men work for pay. The Saturday-night pay envelope contains the tangible results of a week's toil. The natural desire of every man is first to increase the contents of that envelope and second to shorten his hours of work. What to him is the cooking school, etc., compared with an increase in the contents of his envelope. Moreover, his pay he earns, but the cooking school is a gift. At the same time he feels that the gift would not have been made had it not been deserved, and if deserved he would infinitely prefer to spend the money himself than have others spend it for him, even though he gets less for it. In other words, I believe that the sums which these things have cost would have done far more toward cultivating the desired spirit of co-operation if given in the form of increased wages than if spent as they have been. If it be shown, as it doubtless can be, that these sums would have made but a trifling increase in wages the situation is not changed. The men believe otherwise. They have seen large sums of money spent, how much per man per day they do not know nor much care, but they believe the amount to be larger than it is. Regardless of the amount the principle is the same. Money which might have been paid in wages, where they want it, has been diverted to other purposes for which many or most of them care nothing.

To sum it all up, in this world men want pay, not gifts. Raise an employe's wages and you add to his self-respect; systematically make presents to him and you cultivate the spirit of the waiter dependent on his tips, and if he has the self-respect to resent this, as he should, the gifts lead not to friendship but to enmity.

Men value their positions for many reasons, but first of all in accordance with the incomes which they provide, and this brings me to my hobby—the premium plan. I know perfectly well that there have been strikes against that plan, but never yet under circumstances comparable with those at Dayton. The strike at Dayton occurred after Mr. Patterson's plans had been in progress for several years and were well understood. The strikes against the premium plan have been against its introduction, before it was understood and before it had had a chance to show its practical workings. Repeated experience has shown that while cheapening production it does raise wages, and by a greater percentage, I believe, than has ever been demanded in any strike. It is no gift enterprise and deals in no gratuities. The present machinists' strike prevails alike in shops that have it and in those that do not have it. In other words, it has not sufficed to introduce breaks in a wide-spread strike movement like the present one. That its tendency is right is, however, beyond question, and, once well introduced, with its workings made plain by experience, it will, I believe, go further toward insuring against industrial discord than all the altruistic tails which can be attached to the workshop kite.

A meeting of the independent shovel manufacturers of the country was held in Cleveland, Friday, June 21. Plans for meeting the competition of the shovel combine were discussed at length. Another meeting is to be held in the near future. There are ten shovel plants that are outside of the alliance, as follows: Pittsburg Shovel Co., Leechburg, Pa.; Toledo Tube Co., Toledo, O.; Union Furnace & Mfg. Co., Altoona, Pa.; Beal Bros., Alton, Ill.; Penn Shovel Co., Corry, Pa.; A. B. Moore, Atlanta, Ga.; Collier Shovel & Stamping Co., Washington, Ind.; Lewisville Shovel Co., Lewisville, Pa.; Danville Bessemer Co., Danville, Pa.; Richmond Shovel Co., Richmond, Ind.

THE GREAT BIWABIK MINE.

The Biwabik mine, at Biwabik, Mesabi range, which is one of the noteworthy properties on that range, is now actively shipping for its season's output. It has two shovels in the ore and will add another soon. The mining company has recently added a large stripping equipment, consisting of shovels, locomotives and cars, and will hereafter do its own stripping, which is a very material part of its entire mining cost. For the past nine years stripping has been going on at this mine, more or less continuously, and a vast amount of earth has been taken away. Last year's work was over 1,000,000 cubic yards.

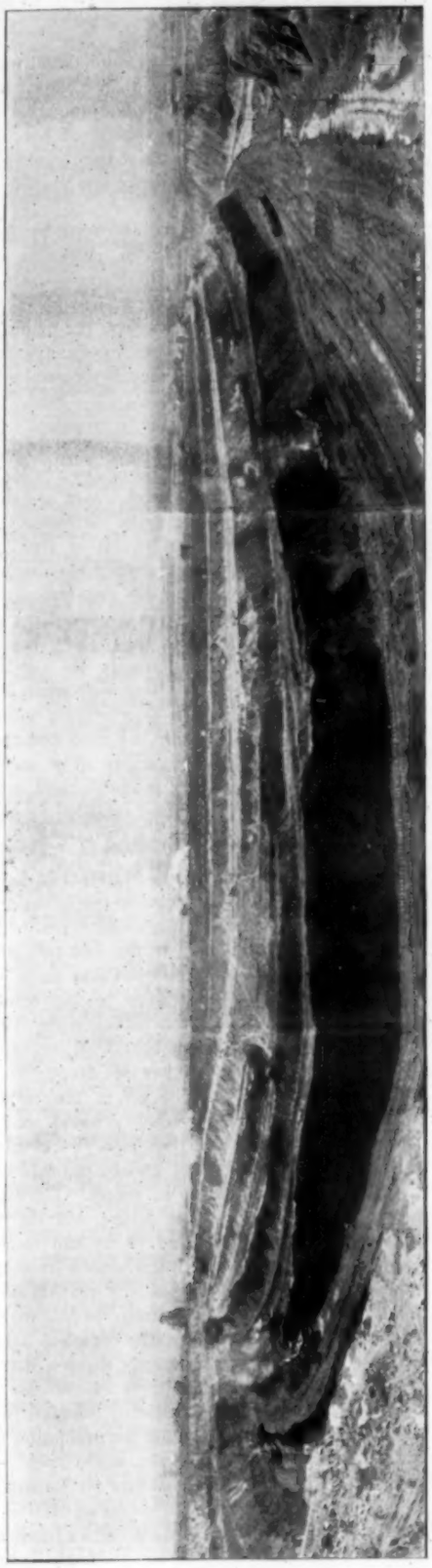


FIG. 1.—BIWABIK MINE, BIWABIK, MINN., SHOWING THE TWO ORIGINAL CUTS CONNECTED.

At this mine the problem of water has been encountered, but contrary to the predictions of old range men it has not caused any change in the method of work. The company has recently purchased the Cincinnati mine and shaft, and will equip this shaft with pumps, draining the open pit to the east and north thereby. The cost of pumping will not be large. The Cincinnati property was bought for $15,000 a few weeks ago.

Biwabik has made some remarkable records in mining by shovel. Last year three shovels, working day shift only, mined 205,000 tons in a month. In ten hours one shovel loaded 5,365 tons into cars from the natural bed of ore. This record was made in spite of the fact that the way to the shovels at this mine is more inconvenient than at any other open pit property in that range, the grades out of the mine being such that a heavy standard locomotive can pull out but two or three cars at a time from some of the shovels, and much time is therefore lost in spotting cars.

The Biwabik has shipped out of the hole shown in the large illustration 2,535,000 tons and has removed therefrom nearly 4,000,000 cubic yards of earth and other overburden. Its shipment last year was 926,000 tons and the probability is that something like this amount will be sent forward the present season. It has opened a large amount of very hard ore, for the crushing of which an 8-ton per minute centrifugal crusher is now being installed.

The mine covers three forties. From the entry at the right hand side of the picture in Fig. 1 to the Cincinnati shaft house, shown in the distance on the left, the distance is about 3,000 feet measured on the circumference of the cut. The width measured on the longest line from cut to cut is 800 feet. The view shows three levels of stripping, the lowest being largely low grade ore

FIG. 2 — MOUNTAIN OF SURFACE STRIPPING FROM BIWABIK MINE. CARS AT THE BASE.

Fig. 2 shows a portion of the waste dump of 1900 at the Biwabik mine. At the base of the pile is a train of ore cars. The dump is 1,000 feet long, 500 feet wide at the base and 50 feet high. It is the product of stripping after April of last year.

The Pressed Steel Car Co. has just received another large order from the Philadelphia & Reading railroad. The order is for 1,000 low side gondola cars and 100 flat cars. Both types of cars are to be built entirely of steel. The gondola cars are to be of 110,000 pounds capacity, similar to the low side gondola cars already built for the P. & R. R. R. They will be equipped with Fox pressed steel pedestal truck frames, cast iron chilled wheels, open-hearth steel axles, Westinghouse air brakes, pressed steel brake beams and Chicago M. C. B. automatic couplers. The flat cars are to be of 110,000 pounds capacity and will have steel floors. From the Chicago & Alton the Pressed Steel Car Co. has received an order for 400 cars. Of these 150 are to be hopper bottom gondolas similar to those already built for the Erie railroad, of 100,000 pounds capacity. The weight of each car will be 35,514 pounds. The other 250 cars will be pressed steel flat bottom gondolas similar to the 600 cars already built for the Alton railroad. They will be of 100,000 pounds marked capacity. The weight of each will be 35,600 pounds.

The Machinists' Strike Lessening--Developments of the Week.

Reports from various cities in which machinists are on strike indicate that more men are at work than at this time last week, and that without any concessions being granted by the employers. The Cincinnati manufacturers, who have maintained a firm stand from the beginning, have been able to break the strike this week and it is expected that the number of men at work there will be steadily increased. At Chicago some of the smaller shops granted the demands of the men but the more important works are holding to the position taken at the beginning. There are signs at good many points that the men are tiring of the strike. The weekly benefits have not reached around and there is some dissatisfaction due to the fact that various settlements have been made on terms short of what the men still out have insisted on.

The National Metal Trades Association has been increasing its membership steadily and now has 212 regular members. The associate membership list is already a considerable one. The Pacific Coast association of machinery manufacturers has joined in a body, with its 141 members. There is also before the association an application for associate membership from the Tri-City Manufacturers' Association, taking in the principal manufacturers of Moline, East Moline and Rock Island, Ill., and Davenport, Ia.

The National Metal Trades Association officers see in the events of the past week the end of the machinists' strike as a disturbing force of any proportions.

Comment from Chicago.

A prominent machinery manufacturer in Chicago who has given much thought to the issues involved has made the following statement to a representative of *The Iron Trade Review:*

"The machinists demanded 12½ per cent increase in the city of Chicago. We offered 5 per cent at the last conference. At the first conference, they were offered 6¼ per cent. Both propositions they refused and went out on strike. Incidentally the strike involves the question of freedom of shop management. To accede to the demands of the union, would mean practically placing each shop at the mercy of the International Association of Machinists. This would result in the extinction of the 'handy' men, the limitation of apprentices, the limitation of output, and shop rules and regulations hostile to the success of any manufacturing business. The growing disposition to interefere with shop management has alarmed the manufacturers throughout the country, who are not primarily opposed to liberal wages, but who see in the growth of the unions a menace to all manufacturing prosperity in this country. The average American manufacturer is proud of the wages paid in this country, and does not entertain the idea that American wages should be on a parallel with foreign wages. The American manufacturer believes that by superior shop management he can more than make up for the difference in the wage paid in this country as compared with that paid in Europe. While admitting that there must be a limit to the wage paid here, the wage proposition is not the paramount question, by any means. If the American machinist will continue to be as efficient as he has hitherto been, his wage will easily take care of itself to his satisfaction.

"Unionism has resulted in an apparent advance of wages now and then, but the showing is purely fictitious. With the constant menace of a strike and collective demands for higher wages, the manufacturer in many instances has been obliged to adjust his wages to meet the conditions, well knowing that whatever individua' raises on account of merit he may have made, he may still be subjected to a collective and arbitrary demand for further amounts. If unionism would keep its hands off the shops of America and leave every mechanic to develop his efficiency unhampered by the dictates of his union, the wage would immediately respond to individual merit as it always has done. The lowest class of mechanic may have been helped to a higher wage through his union, but the best mechanic has been correspondingly robbed of his independence. The manufacturer hapes to resist this leveling process of unionism and restore the independence and manhood of the American mechanic.

"The temporary increase of wages secured by force and intimidation will not help the workmen, unless at the same time they secure the right to serve their employers as honest men should. If shop restriction is allowed to go in America, the result will be that loss of supremacy in the manufacturing world now generally accorded to the American everywhere. The Americans won their proud place before unionism had laid its grip on the situation.

"As to the present machinists' strike, it is patent to all that it is not nearly as extensive as it is advertised to be by the general officials of the International Association of Machinists, and the situation is daily growing better. Men are constantly returning to work where they have been led out by the false representations of their union leaders. It is true in many cases compromises are being made between the manufacturer and the workmen. In many of these instances, conditions exist which seem to the manufacturer a compelling force to make him submit to any demands. In all such cases where coercion is employed, there will certainly be a natural reaction. Like all other strikes, this one will wear itself out without benefit to either party. It is a wholly unnecessary industrial disturbance brought on by the mad ambitions that were allowed to overrule the obligations of a sacred contract. In any event, the cause of conciliation and arbitration has been turned back on its course and retarded by years."

The Strike at Milwaukee.

Since the New York meeting of the National Metal Trades Association, eight additional Milwaukee firms have joined the association and nearly all the important firms in the Milwaukee district are now members. In the past two weeks the Milwaukee machine shops have been open and there has been partial operation, some of the strikers having returned to work, while a number of men from other cities have been hired. The following statement on behalf of the Milwaukee manufacturers states the issue as they see it:

"The present strike was brought on in the metal trade shops, in this vicinity at least, by the demand that a new agreement quite different from the New York agreement (which was still in force) be signed, and by the refusal of the machinists to arbitrate the question of wages. The issues are nominally shorter hours and higher wages, but the 54 hour week having been previously agreed to by the metal trade shops, the question of wages could and would have been arbitrated, excepting for the action of the machinists. Now that the fight is on, it has resolved itself, on the part of the manufacturers, into a protest against the complete union control of the shops, which would ultimately mean a decrease in the output, and a corresponding increase in the cost of product. No attempt has ever been made to interfere with the proper functions of the unions, and no discrimination is made or to be made between union and non-union men."

The Milwaukee strike went to the courts on Saturday, June 22, when the Vilter Mfg. Co. applied for an injunction to prevent its striking employes picketing its premises or interfering with the men at work. Court Commissioner Hugh Ryan of the Circuit Court of Milwaukee county, granted the injunction, which is to stand until further order of the court. It enjoins the defendants and the International Association of Machinists and all its members and the members of subordinate lodges as follows:

"From congregating or being upon or about the sidewalks

or streets or alleys or places adjoining or adjacent to the premises of said plaintiff hereinafter described, or upon or about said premises:

"From hindering or preventing or attempting to hinder or prevent, by threats, intimidation, force, abusive language, duress, or coercion of any kind, any person or persons from engaging in or continuing in any work or employment for or on behalf of said plaintiff, or on or about its said premises.

"And from so hindering and preventing or attempting to hinder or prevent, any person or persons from freely entering upon or leaving said premises of said plaintiff.

"And from in any way interfering with or hindering or preventing, or attempting to hinder or prevent, the carrying on or management of the business of said plaintiff; and from trespassing or coming upon said premises of said plaintiff.

"And from compelling anyone in the employ of or seeking employment from said plaintiff, to listen to any arguments of the said defendants or their co-conspirators or pickets, or any of them, against his will.

"And from persuading or inducing, in any manner, any person to join in the organization or furtherance of any conspiracy to compel this plaintiff to give up or abate, in any way, its control of its factory and business.

"And from inducing, by threats or otherwise, any person or corporation to refuse to furnish or to sell to this plaintiff, or any of its employes, supplies or other merchandise.

"And from doing any act tending or intended to compel said plaintiff, against its will or the will of its officers, to operate its factory or employ or discharge any workmen in any manner or upon any terms prescribed or to be prescribed by an association or union; or to refrain, against its will or the will of its officers, from operating its said factory in any lawful manner; or to refrain, against its will, from hiring, discharging, in any lawful manner, such workmen or upon such terms as to said plaintiff or its officers may seem best."

Little Change in New England.

(Special Correspondence)

PROVIDENCE, R. I., June 24.—Many of the reports recently circulated, in regard to the extension of the machinists strike throughout New England, have not at this meeting crystallized into facts. It is alleged that the vote of a local lodge of the union is essential to the starting of a strike and the character of the victories thus far won is not of so encouraging a type as to precipitate similar proceedings elsewhere. In this connection there are unpleasant rumors in regard to the manner in which the union has disbursed the amounts promised as weekly payments to the strikers.

A settlement has been attained between the International Power Co. and its employes. The text of the agreement follows:

1. We will operate our works on a schedule of 54 hours per week for day men, as follows: 9¾ hours for the first five days of the week and 5¼ hours on Saturday.

2. We can make no change in rate of wages at this time, but will post on October 1 the increase that we can afford to give.

3. We will pay 1½ time for overtime up to 12 p. m., and double time after 12 p. m., and on Sundays and holidays, except for work on our own plant, for which work the present rates are to continue unchanged.

4. We will arrange a 54-hour week for night men.

5. All employes will be reinstated in their former positions without discrimination.

6. Every man must pledge himself not to participate in any strike hereafter without first having submitted any requests which he may have to make, and which would form the basis of a strike, to the attention of the management and received a reply from it. The management, on its part, pledges itself to make reply within 30 days.

7. All men, now at work for us, must be retained after the termination of the strike, and no discrimination in the nature of disagreeable treatment or otherwise, shall be used against them, and any infringement of this shall be considered a cause for immediate discharge.

A careful reading of the above suggests a belief that the several items could have been obtained by amicable arbitration in the first place.

The condition at Westerly, this state, remains about the same so far as the machinists are concerned. The employes of the C. B. Cottrell & Sons Co., manufacturers of printing presses, still maintain the strike undertaken last month. It is stated that the business conditions at the shops are not now favorable to the employment of all the men who went out and that they would not be taken back in a body in any event, that the firm would exercise therefore a choice in the selection of the most desirable workmen from the individual applications for employment. An attempt on Saturday to bring about a settlement, presumably on the lines of the one signed by the Internation Power Co., failed, though hopes are entertained that another meeting may have better results.

In Bridgeport, Conn., the manufacturers' association declares that there is now nothing to arbitrate and no further proposition will be considered; that the factories are open to any workman who wishes to come back on the old terms. The American Ordnance Co. is seeking non-union machinists in Rhode Island.

The strike movement is having an effect that may not have been anticipated by the machinists' union. Plans for a machine shops in the vicinity of Providence are now held up, pending the general settlement of the questions in controversy. Capital is somewhat chary of any lavish outlay upon new enterprises unless the surrounding conditions are favorable to a fairly definite remuneration, and the contingency of a strike is not an encouraging business factor in such a proposition.

The textile business, mainly in cotton goods, is improving and the action will doubtless have an effect upon the demand for textile machinery, a department of the metal industry that has been dull for some months. R. I. C.

An Injunction at Cleveland.

The application of the Cleveland Punch & Shear Works Co. of Cleveland, for a permanent injunction to restrain its striking employes from picketing the works or from interfering with or intimidating the men at work was argued on Tuesday, June 25. Attorney Jay P. Dawley, speaking for the plaintiffs, charged that as soon as the men left the employ of the company they immediately commenced to practice coercion and intimidation with other men in the employ of the company. "I hold," continued the attorney, "that these acts are unlawful according to the interpretation of the supreme court of the United States. We demand the right to operate our shops free from any molestation. A free continuance of the system of picketing employed by the striking machinists at the punch and shear works means in the end nothing but bloodshed, rioting and anarchy." The court will decide the question on Saturday, June 29.

President Baer on the Real Issue in the Strike.

President Geo. F. Baer, president of the Philadelphia & Reading Railway Co., has addressed a letter to the employes in the shops of the company at Reading, who are out on a strike for the 9-hour day and for various local demands. After referring to the items in the men's demand, and reviewing the cordial relations that have existed between the company and its employes, President Baer makes some observations that bring out the real issue in the whole movement, and takes the position many another manufacturer is taking in the face of a demand that he surrender the control of his shop and bow to the coercive regulations of the union:

"This is no controversy over wages. We have never had any trouble to adjust wages with our men. It is a bold attempt to compel us to recognize the various labor organizations and be subject to their control and management; in other words, we are asked to permit the officers of labor organizations who might belong to other trades, and are ignorant of our business, to determine all questions relating to the management of our railway shops.

"We fully understand what this involves. An occurrence at the Harry E. colliery of the Temple Iron Co., of which I am the president, illustrates the tyranny of labor organizations. A carpenter who was a non-union man was engaged in repairing cars. The mine workers' union demanded that this man be discharged because he was a non-union man. The company refused to discharge him. On June 15 the miners struck because of this refusal, and the colliery is still shut down.

"Under the law of the land every man has a right to work and determine for himself the conditions under which he will work. We will make no distinction so long as a man discharges his duties. We will not inquire into his religion, his politics, his nationality or his connection with beneficial or labor organizations, but just as we will not permit a Protestant to say that no Catholic shall be employed nor the Germans and Irish to say that no Hungarians or Italians shall be employed, neither will we permit labor organizations to control our business and select our workmen and compel us to employ only members of these organizations. Come what will, come what may, there will be no departure from this rule.

"The men that are on a strike are hereby given an opportunity to return to work not later than Tuesday morning. If they do not we will pay them off, and from that time they will cease to be employes and members of the relief association. After Tuesday the officers will take steps to fill the places of the non-reporting men.

"There must be many among you possessed of sound common sense who have strength of character enough to refuse to be led by the nose by these strangers and mischief makers. I beseech you, as a friend, to think seriously over this matter; think of your families, of your homes, of your towns and cities. If you are in doubt, consult our good, honest, law abiding neighbors. Be not deceived as to the outcome; there will be no wavering or shadow of turning on the part of the company.

"To the many who have continued at work the company extends thanks and congratulations, and assures them that their services are appreciated and their fidelity will always command the support and protection of the company. We will at all hazards assist you in the defence of your right to work."

Cincinnati Shops Open.

The employers of machinists at Cincinnati opened their shops on June 24 and notified their employes that their places were ready for them. Up to noon it was stated by the local metal trades association, 300 strikers had returned, making the number of men at work 1,000 out of a full force of 4,000 to 5,000. The strikers doubled their pickets but there was no collision, excepting a slight set-to at the Fay & Egan Co. works. The shops were opened without any concessions to the men.

At Other Points.

At Hamilton, O., June 25, the Hamilton Machine Tool Co. applied for an injunction to prevent the picketing of its works by strikers.

The Pond Machine Tool Works, Plainfield, N. J., opened their works to their old employes this week. One regular machinist and eight gang bosses returned last week. Special policemen have been provided so that there may be no interference with men who want to work.

The settlement of the strike at R. Hoe & Co.'s plant in New York last week brought back 700 men on the terms the company originally offered. The men get a 9-hour day without reduction of pay, but the firm hires whomever it chooses without reference to the union.

The Russel Wheel & Foundry Co., Detroit, has fitted up quarters for the men at work and is boarding them within its premises. The Northern Engineering Works of Detroit, are offering 30 cents an hour for 55 hours work per week.

Judge Stewart, of York, Pa., has handed down an opinion continuing the injunction against striking molders and machinists in that city. The opinion is sweeping and prohibits the union, its members, agents, employes or strikers from picketing the shops of the York Mfg. Co. and railroad stations.

The annual meeting of the Dominion Iron & Steel Co. was held at Montreal, Que., Wednesday, June 13. Directors were elected as follows: Sir W. C. Van Horne, R. B. Angus, James Ross, Hon. George A. Cox, Elias Rogers, Hon. Robert Mackay, H. F. Dimock, A. H. Paget, Hon. David Mackeen, W. B. Ross, B. F. Pearson, J. S. McLennan, A. J. Moxham, H. M. Whitney and F. S. Pearson. At the meeting of the directors H. M. Whitney was re-elected president; A. J. Moxham, vice-president and general manager. Owing to the recent death of his son, Mr. Moxham was unable to attend the meeting to present his report, and the meeting was adjourned until June 26, when the manager's report will be read. President Whitney informed the stockholders that two furnaces are now in operation and that iron was being shipped all over Canada, to the United States and Great Britain. Two other furnaces will be ready to blow in during July and the steel plant will be ready in September.

Rolling Mill Machinery Consolidation.

The consolidation of three and possibly four of the roll and rolling mill casting manufacturers of Pittsburg, together with one plant at Youngstown, O., will shortly be announced. The plants in Pittsburg that will be included in the combination are as folows: Frank-Kneeland Foundry & Machine Co.; Lincoln Foundry Co. and McGill & Co.; the outside concern is the Lloyd Booth Co. of Youngstown, O. When the announcement of the consolidation is made in about two weeks it is probable that another large Pittsburg roll manufacturer will be included. The above named plants have already been appraised, although the amount of capitalization has not yet been decided. The new company will be chartered under the laws of Pennsylvania. It has been practically decided to issue only one kind of stock. For a time at least after the consolidation the individual plants will retain their identity but it is probable that in the near future all will be combined into one large plant probably located in the Pittsburg district. The consolidation is for the purpose of preventing the continual duplication of patterns and each plant will be assigned a class of work for which it is best adapted. Operating expenses will be reduced in other ways that will make the consolidation more profitable and economical than the operation of the individual plants.

Sharon Steel Co.

During the past week the preferred stock of the Sharon Steel Co. of Sharon, Pa., was quoted at 200 to 205 on the Pittsburg stock exchange. This price was asked but no sales were made. For several weeks there have been bids of 150 to 160 for this stock but none was offered on the market. The high price asked for the stock is reported to be due to the negotiations which the United States Steel Co. is carrying on for procuring it. It is stated that the shareholders are insisting on better than 200 before they will sell out their interests. In connection with one recent negotiation for this stock 250 was asked by the holder.

Proposed Forge Consolidation.

D. S. Bissell of the Duquesne Forge Co. of Braddock, Pa., is promoting a combination of the manufacturers of heavy forgings in the Pittsburg district and is at the head of the movement to erect a large forging plant at Youngstown, O. Plans have not yet fully matured with reference to the proposed consolidation, but it is probable that the plant of the Pittsburg Forge & Iron Co., whose owners have been approached on this deal and that of the Duquesne Forge Co. will be consolidated if the deal goes through. It is also the intention to erect a large plant at Youngstown, O., to make heavy forgings for plants in the Youngstown district and for shipment to lake ports for shipbuilding purposes. H. K. Wick of Youngstown, O.; Julian Kennedy of Pittsburg and others have been interested, according to reports.

The plant of the Baltimore Dry Dock Co. which has been operated under a lease by the Columbian Iron Works and Dry Dock Co. at Baltimore, Md., was not sold at auction last week as advertised. A syndicate composed of J. Q. Lovell, J. W. Middendorf and D. H. Gordon succeeded in purchasing all the stock and bonds of the company and withdrew the property from sale. The new owners have already taken posession of the property and will operate under the name of the Baltimore Shipbuilding and Dry Dock Co. The new company's financial plan will include $200,000 of bonds, $250,000 of preferred stock and $300,000 of common stock.

TIN PLATE SCALE SIGNED.

The wage conference between officers of the American Tin Plate Co. and a committee of the Amalgamated Association, which was begun last week in Cleveland and adjourned, came to an end shortly after Tuesday midnight, and the scale was signed. For rolling plates of ordinary sizes no advance was made as the association decided to ask for no advance in convention. There was a re-arrangement, however, of the scale as the company will hereafter pay the screw boy entirely, instead of sharing his wages as before between the roller and the company. This makes an apparent slight reduction in the roller's scale but practically is the same as the scale last year when part of the wages was paid the rollers. Clause 6 of the scale had been made clause 5 in the new scale and as adopted the men receive an advance over last year's scale for rolling wide plates. The clause as adopted reads as follows:

"That all sheets or tin plates, 14 square feet and over when finished in six or more sheets to the pack shall be paid for at the following rates above tin plate scale: Ten per cent extra on 26 gauge and heavier, and 20 per cent for all lighter gauges up to and including 32 gauge. And for all sheets and tin plate 15½ square feet and over finished in fours the same percentage shall apply. It is understood that on plates worked on a tin mill less than the above superficial square feet and not first pickled, annealed, cold rolled and thoroughly treated for tinning purposes before leaving the mill where they are worked the above percentage shall apply. This does not include the shearman as his wage for sheet work is based on jaw or crocodile work. All black plate orders to be marked on the bar when brought to the mill. The remainder of the footnotes were adopted practically as drawn up in the scale convention.

The settlement of the scale means much for the American Tin Plate Co., owing to the large amount of tonnage now carried on its books for delivery during the summer months. It is hardly probable that any of the tin mills will be closed down except for much needed repairs.

Bar Iron Conference Without Agreement.

After a conference lasting nearly a week at Cleveland, O., the Amalgamated Association officials and manufacturers failed to reach an agreement on the bar iron scale. The non-interruptive clause as amended in convention by the Amalgamated Association is not at all satisfactory to the representatives of the Republic Iron & Steel Co., and the American Steel Hoop Co., and it is this that is causing the delay in the settlement of the scale rather than the advance asked for by the puddlers and finishers. Another conference will be held in Pittsburg on Friday, June 28.

The conference on the sheet mill scale began in Pittsburg Wednesday, June 27. The tin house workers failed to reach an agreement with the American Tin Plate Co. in their conference of last week. An adjournment was taken to meet in Pittsburg Friday, June 28. The tin house scale year does not expire until July 15. The men are asking an advance of 15 per cent.

The plant of the National Cash Register Co. at Dayton, O., which has been closed since May 3, on account of a strike, resumed operations last week, all the employes except the polishers and molders returning to work on the same conditions that existed before the strike. The following formal statement was issued to the employes of the company by President J. H. Patterson: "To All Employes of National Cash Register Co.:—Having been formally notified by representatives of the Allied Mechanics that this body, representing about 1,100 of our employes, has unanimously voted to return to work as they left it; therefore, this company hereby notifies all of its employes that its factory will open for work at the usual hour tomorrow morning, Wednesday, June 19. We hope that all of our employes will return to work." The machinists have returned to work pending an settlement of their grievances.

The Waynesburg and Washington, Pa., tin plate plants operated by W. H. Griffiths & Co., have signed the Amalgamated Association scale unconditionally. If any concessions from the present scales will be made these plants will receive the benefits derived therefrom, however. The Emlyn Iron Co. at East Chicago, Ill., has also signed the scale. The first company to sign the scale was the Tyler Tube Co. at Washington, Pa.

PLANS FOR THE CARNEGIE TECHNICAL SCHOOL.

(Special Telegram.)

PITTSBURG, June 26.—The advisory committee of four prominent educators appointed by the board of trustees of the Carnegie Institute to investigate the needs of the proposed schools of technology to be presented to the city of Pittsburg by Andrew Carnegie have reported in favor of establishing three grades of schools. The first will be the Carnegie Technical College, the second, the Carnegie Technical High School, and the third, the Carnegie Artisan Day and Evening Classes. The technical college will provide a technical education superposed upon a high school curriculum and will include engineering in all its branches. The technical high school will be superposed on the work of the grammar schools and in addition to the regular high school studies the curriculum will include study in blast furnace and foundry practice, brass founding and finishing, pattern making, metal working, stationary locomotive and marine engine and boiler management, light and power station management, gas manufacture, railroad transportation and several other departments, adapted to the varied industries of the Pittsburg district. The Carnegie Day and Evening Classes will be for the benefit of those who are unable to take advantage of the more complete courses in the technical high school. As planned the buildings and grounds will require about 50 acres.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The Uniform Steel Co. has located a plant at Newark, N. J., for the manufacture of crucible steel. The company is incorporated with a capital of $60,000 and the headquarters of the company are located at 320 Broadway, N. Y. George F. Brown is manager.

The Sanitary Can Co. of Brooklyn, N. Y., has been incorporated with a capital of $100,000, of which $75,000 is preferred and the remainder common. William Haaker, W. C. Kraft, R. F. Mullens, T. F. Mason and William Kraft are the incorporators.

A charter was granted the Harvey Burner and Furnace Co., of Reading, Pa., last week, with a capital of $100,000. It will manufacture and sell furnaces and burners for use in iron, steel and other mills where the heating of metal is required. The burner is the invention of H. E. Aumer, of Reading, Pa. The fuel is to be used in the burner and furnace is crude oil. The plant of the Brogan Cast Steel Mfg. Co., near Reading, is being equipped with burners.

The Parker Wire Goods Co. of Worcester, Mass., has been incorporated with a capital of $10,000. Edward D. Priest, Arthur H. Parker and J. M. Jackson are the incorporators.

The Everson Steel Co. of Charleston, W. Va., has been incorporated with a capital of $3,000,000. George F. Mercer, James T. Wakeman, George H. Everson, Thomas E. Clark and Henry Goodman are the incorporators.

The Federal Coal & Coke Co. of Pittsburg has been incorporated by G. S. Rumbaugh, W. F. Fundenberger, H. E. Lineaweaver, Stephen Stone and A. P. Mayer to operate coal tracts and operate coke ovens in Westmoreland county, Pa.

The Detroit Galvanized Sheet and Metal Works will add a tin can manufacturing plant in the very near future.

The Reliable Foundry Co. has been incorporated at Quincy, Ill., with a capital of $5,200. William J. Reese, Carl Becker, Anton Weibmer and C. W. Sahland are the incorporators.

The Maryland Range Co. which has been incorporated with a capital of $300,000 will erect a plant at Baltimore, Md., for the manufacture of strap and T hinges, butts and shelf brackets.

The Midland Iron Works of Racine, Wis., have been incorporated with a capital of $10,000. G. N. Prentiss, Thomas Wilbern and E. M. Durney are incorporators.

The John Morrow Machine Screw Co., Ltd., of Ingersoll, Ont., has been incorporated with a capital of $75,000, to manufacture machine screws, bolts and nuts. The new company

will take over the business formerly carried on by J. A. Coulter and Rebecca M. Morrow. J. A. Coulter, James McBurney, W. H. Wortman, P. J. Myler, R. H. Deacon, O. E. Robinson and H. Beattie are the incorporators.

The Damascus Brake Beam Co. of St. Louis has been incorporated with a capital of $20,000 by Albert Waycott, J. S. Andrews and Thomas Dunn.

The Canada Brass & Electrical Co., Ltd., has been incorporated with a capital of $100,000 to take over the partnership business of J. G. Howorth and A. H. Howorth, who are directors in the company together with A. M. Brodie, M. A. Thomas and A. J. Pattison.

The Everson Steel Incorporation Co. has been incorporated in West Virginia with a capital of $3,000,000. The incorporators are George F. Mercer, James T. Wakeman and George Everson, of Pittsburg, and Thomas L. Clark and Henry Goodman, of Bellevue, Pa.

The Structural Steel Car Co. of Canton, O., has been incorporated with a capital stock of $500,000. A plant will be built, it is stated, the company being located through the Canton board of trade.

The Auto Coupler & Supply Co. of Newark, N. J., has been incorporated with a capital of $100,000. The company will manufacture a patent car coupler.

Fires and Accidents:—

The Lewisburg machine shop, operated by Hardison & Arthur at Lewisburg, Tenn., was destroyed by fire last week; loss, $8,000.

The Pennsylvania Steel Co. bridge which crosses the Pennsylvania canal at Steelton, Pa., collapsed recently when six ladles filled with molten metal were being transported from the furnaces to the Bessemer plant. A terrific explosion occurred when the metal struck the water, but the train crew steamed away on the locomotive in time to escape the explosion. Considerable trouble will be experienced by the company in transporting its metal from the furnaces to the Bessemer converters until the bridge can be rebuilt.

The foundry operated by Andrew Peterson at Brooklyn, N. Y., was destroyed by fire last week. Loss, $8,000.

Fire in the foundry of the Des Moines Mfg. Co. at Des Moines, Ia., damaged the plant to the extent of $3,000.

The sheet metal plant of Marlin & Co., located at Thirtieth and Smallman Sts., Pittsburg, Pa., was partly destroyed by fire last week. The damage to equipment is estimated at $4,000, to the building $1,000 and to stock $1,000.

New Construction:—

The Youngstown Iron, Sheet & Tube Co. of Youngstown, O., last week voted an increase in capital from $1,000,000 to $2,000,000. The increased capital is to be used in the erection of a blast furnace and a steel plant. Steel sheets will then be rolled as well as iron.

The Denver Iron & Wire Works of Denver, Col., has under contemplation plans for the erection of an extensive foundry.

The Compressed Air Co. of New York City has plans completed for the expenditure of about $40,000 on new buildings and an almost equal amount for new machinery for the enlargement of its compressed air plant at Rome, N. Y., for locomotive building and repair work in addition to manufacturing compressed air cars. A new erecting shop and central power plant will be erected immediately. In the erecting shop two 50-ton cranes will be installed. All the machinery will be operated by compressed air.

The contract for the erection of the coppersmiths' and plumbers' shop and foundry at League Island Navy Yard, Philadelphia, was given to L. L. Leach & Son, of Chicago.

The Toledo Metal Wheel Co. of Toledo, O., will erect an addition to their plant four and one-half stories in height and 200 feet long and 75 feet wide. The Ollard Machine Works of Tacoma, Wash., will erect an addition 40x40 feet. An electric crane for handling heavy machinery will be installed in the new plant.

The Pittsburg District:—

The George A. Hogg Iron & Steel Foundry Co., 24th and A. V. R. R., Pittsburg, Pa., is running its entire plant night and day. Among the orders recently received were the following: From the Canton Steel Co., Canton, O., for a 10-inch train of rolls complete, counter shaft for the same, one large bar shear with a capacity to cut 2½ inch square and about 75 rolls all turned complete for their different sized mills; from the American Car & Foundry Co., Chicago, for one of H. W. Fowler's patent mills for rolling steel car wheels; for a heavy bar shear with a capacity to cut 3 inches square, for the Pittsburg Forge & Iron Co.; from the Detroit Steel & Spring Co., of Detroit, for a double vertical lever shear; from the Hagar Iron & Steel Co., St. Louis, for a double vertical lever shear; an order to equip the American Tin Plate Co.'s plants at Cleveland and at Lisbon, O., with the Freeman patent furnace charger, including line shafting and gearing for operating the same; for a bar shear with a capacity for cutting 2 inches square, from the Atlanta Steel Hoop Co., of Atlanta, Ga.; for a 60-ton fly wheel for the Midland plant of the American Sheet Steel Co., Muncie, Ind.; for a 20-ton fly wheel from the Page Woven Wire Fence Co., Monessen, Pa.; from the Louisville Bolt & Iron Co., of Louisville, Ky.; for a 350 horse power Aetna engine and a heavy bar shear with a capacity to cut 3 inches square.

The Mexican Central railroad has contracted for a large steel frame pier to rest upon galvanized steel cylinders 72 inches diameter, made at 5-8 inch plates. Owing to the great bulk of the cylinders Wm. B. Scaife & Sons, of Pittsburg, were obliged to erect an addition to their large galvanizing plant, especially for this work.

A large amount of new buildings continue to be projected in Pittsburg. The Farmers Deposit National Bank Building to be erected at the corner of Fifth Ave. and Wood St., will be 22 stories. Two stories are to be added to the 15-story Park building and the Westinghouse building is to be increased four stories in height. On Fourth Ave. another 15-story building is to be erected by the Park Brothers and the amount of structural material that will be required in these operations is estimated at 15,000 tons.

The Tyler Tube Co. of Washington, Pa., is the first concern to sign the Amalgamated Association scale for the ensuing year. The scale was signed in Pittsburg last week by this company, unconditionally.

The Pressed Steel Car Co. has been awarded a contract by the Philadelphia & Reading railroad for 1,000 gondola and 100 flat cars. The gondola cars are to be of a low-side type. All cars will be equipped with Fox steel truck frames, Westinghouse airbrakes, Pressed Steel Car Co.'s brake beams and M. C. B. automatic couplers. Since the company commenced the manufacture of steel cars four years ago 40,578 cars were built.

Major Charles F. Powell, United States Engineer in charge of improvements on the Monongahela river last week awarded contracts for iron and steel products for locks 11 and 12 as follows: The Bethlehem Steel Co., 117,960 pounds of valves, valve frames, etc.; James Reese & Sons, Pittsburg, bolts, washers, etc., 79,310 pounds; Wagner-Palmose Mfg. Co., 24,570 pounds of eye bars.

Adams, Low & Co., of Pittsburg, dealers in new and second hand steam shovels, saddle tank locomotives and rails report an exceptionally good demand for light locomotives. During the past six weeks the company has disposed of nine light locomotives made by the Vulcan Iron Works of Wilkesbarre, Pa., one order placed by the American Coke Co., calling for two locomotives.

The equipment at the Edgar Thomson plant of the Carnegie Steel Co. for rolling tin and sheet bars is to be removed to the Ohio plant of the National Steel Co. at Youngstown, O. This will increase the tin and sheet bar equipment of this plant very largely. The steel rail equipment at Youngstown was recently removed to the plant of the Illinois Steel Co. at South Chicago. Nothing but rails will hereafter be rolled at the Edgar Thomson plant.

The office force of the Oliver Mining Co. which is the ore department of the Carnegie Steel Co. left last week for Duluth, Minn., the new headquarters of the ore properties of the United States Steel Corporation. There were 16 in the party.

The Pittsburg officials of the Wabash railroad have asked for bids for the construction of a great cantilever bridge to be built across the Monongahela river at Ferry St. Bids will be opened by chief engineer J. W. Patterson on July 8.

About 8,000 tons of steel will be required in the construction of the superstructure.

The McClintic-Marshall Construction Co. of Pittsburg has been awarded a contract by the Pennsylvania Railroad Co. for 1,000 tons of plate bridge girders. This material will be fitted at the new plant which the company has nearly completed at Rankin. The capacity of the plant will be 4,000 tons of material per month.

The Union Steel Co. has acquired 30 acres of additional land at Donora, Pa., upon which will be located the large additions to the plant to be made shortly. The wire nail and wire mills of the company will commence turning out their product about July 1.

The Pressed Steel Car Co. has received an order for 400 pressed steel cars from the Chicago & Alton Railroad Co. One hundred and fifty of these will be hopper bottom gondolas while 250 will be flat bottom steel gondolas.

The Riter-Conley Mfg. Co. has been awarded the contract for the erection of the steel buildings of the new mills to be built by the Colorado Fuel & Iron Co. The contract calls for the erection of an open-hearth, rail mill and foundry buildings, and will require more than 10,000 tons of structural shapes.

The Mesta Machine Co. of Pittsburg is making shipments this week from its plant at West Homestead, Pa., of a 34-inch universal slabbing mill with reversible tables and manipulator for the Cambria Steel Co. at Johnstown, Pa. The mill proper is made entirely of steel castings. The housings weigh 25 tons each and are annealed. In order to anneal them a special annealing furnace had to be built. This will be kept for future use. The annealing of such large housings is out of the ordinary and in the future it is probable that specifications for rolling mill housings will provide for their annealing.

General Industrial Notes:—

The Lloyd Booth Co. of Youngstown, O., was awarded a contract last week by the Republic Iron & Steel Co. for the installation of a fourth stand of rolls in the new Bessemer plant at Youngstown. The Lloyd Booth Co. also received the contract for heavy hydraulic shears for the same plant. The Haegar Steel Co. of St. Louis, will also install a 16 and a 9-inch mill to be built by the Lloyd Booth Co.

The American Sheet Steel Co. has under advisement the erection of three additional sheet mills at its Struthers, O., plant. The engine that now operates three trains of rolls broke down last week and two mills had to be shut down. It is the intention to install a new engine that will be powerful enough to operate three mills on either side. The plant now contains five mills with one in the course of erection.

The Ellis & Lessig Steel & Iron Co. of Pottstown, Pa., has advanced the wages of the puddlers in its employ 25 cents per ton to $4.

One of the Oxmoor furnaces of the Tennessee Coal, Iron & Railroad Co. is being dismantled and the machinery is being removed to Ensley, Ala. It is probable that the other Oxmoor furnace, now out of blast, will also be dismantled and the machinery removed to Ensley. It is the policy of the company to concentrate its plans as far as possible in the Ensley district.

Owing to the large number of strikes which the Buffalo Forge Co. of Buffalo, N. Y., has recently passed through, it is reported that the officers of the company are looking elsewhere for a location for their plant.

The Lalance-Grosjean Mfg. Co. will add two open-hearth furnaces to its Woodhaven plant near Harrisburg, Pa. Gas producers will be installed and other improvements and additions have been decided upon that will greatly increase the capacity of the works.

The new plant of the Kokomo Steel Wire & Nail Co. will be located at Kokomo, Ind., instead of in the Indiana coal fields as was at first decided. A satisfactory rate for transporting the fuel has been made by the railroads. The citizens of Kokomo will donate a site and $15,000.

The plant of the Illinois Bridge & Machine Co. will be removed from Jacksonville, Ill., to Litchfield, Ill. A site has been offered the company at this latter town for the removal of the plant.

The Toledo Machine & Tool Co. of Toledo, O., has shipped a number of punch presses to England and Scotland and has just been awarded a contract by the United States Government for presses for the machine shop that is being equipped at the Rock Island arsenal.

The Vaughn Machine Co. of Peabody, Mass., last week granted the striking machinists for a 9-hour day and an advance of 12½ cent.

The North Birmingham furnace of the Sloss-Sheffield Steel & Iron Co., located at Birmingham, Ala., is being relined and repaired and will blow in on basic iron.

The work of rebuilding the plant of the Empire Machine Works at Doyleston, O., recently destroyed by fire, has begun.

The Cambria Steel Co. of Johnstown, Pa., has received an additional order from the Reading Railroad Co. for 1,000 steel cars. Delivery has already commenced on the first order for 500 cars placed by the Reading railroad.

The Sharpsville blast furnace at Sharpsville, Pa., was blown in last week after being idle several months. Extensive repairs were made.

The long standing question of reduced working hours between the foundrymen and molders of Youngstown, O., has finally been arranged. The molders will get a 9½ hour day being July 1, 1901, until Jan. 1, 1902, when they will be granted a 9 hour day. They will continue to receive $2.75 per day.

The output of the Central Iron & Steel Co., Harrisburg, Pa., has been 60,000 tons in the last six months.

The wages of the metal carriers employed at the Bessemer plant of the Republic Iron & Steel Co. at Youngstown, O., has been increased from 60 cents to 70 cents the 100 tons.

The Stilwell-Bierce & Smith-Vaile Co., of Dayton, O., has just received an extensive order for Victor high pressure turbine water wheels to be used by the Quiatchouan Pulp Co., Quiatchouan, P. Q., Canada. The wheels will operate under 240 feet working head of water and the pulp mill will have a daily capacity of 30 tons of pulp. The order includes two 1,000-h. p. wheels for driving pulp grinders, one 500-h. p. wheel for driving screens and wet machines and one 100-h. p. wheel for driving an electric plant.

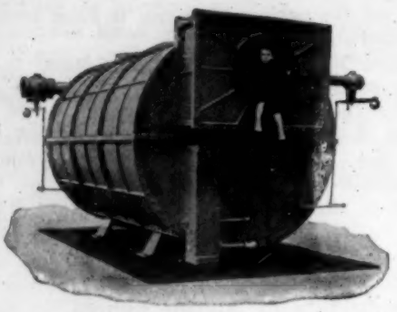
The National Cash Register Co., Dayton, O., has advertised for metal polishers and carpenters to take the places of those not returned to work. The factory will be an open shop in these departments if the union men do not return to work.

The West and Northwest:—

The Chicago Ornamental Iron Co. of Chicago, Ill., has secured a new location for its plant on Stewart Ave., near Thirty-seventh St. The works of the company are now located at 26th and Halsted Sts. Plans have already been made for a series of buildings to cover the greater portion of the site secured.

The Northern Electrical Mfg. Co. of Madison, Wis., through its Chicago office, secured the contract for the entire equipment of the new central station being built by the Citizens' Electric Light Co. of Battle Creek, Mich. The installation will consist of one 275 and one 135 K. W., two-phase, Stanley inductor alternator, together with station and sub-station switchboards, step-up transformers, etc. The larger unit will be belted to a water wheel of about 350-h. p., and the smaller one will be driven by a Buckeye engine. On account of the limited and uncertain water power available, it will be necessary to operate these generators in parallel, the smaller unit taking its load automatically in proportion to the power of the water wheel. This would mean that the water driven unit will at all times carry the bulk of the load; the engine driven unit only being called upon when the power of the water wheel falls below normal. These conditions have been met and satisfactory results accomplished in many plants equipped with Stanley apparatus.

The Allis-Chalmers Co., whose general offices are in the Home Insurance Bldg., Chicago, sends out an announcement of its formation under date of June 10. It will continue to build, under the same management the same lines of machinery as heretofore manufactured by the several companies. These are: Reynolds Corliss engines, pumping engines, blowing engines, hoisting engines, Riedler pumps and compressors, air compressors, Gates rock and ore breakers,



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Now you can pipe up a **COCHRANE FEED-WATER HEATER AND PURIFIER** in such a manner that it does not make any difference whether you are passing 100 or 500 H. P. of exhaust steam through the main, so that the heater itself, being arranged to draw its supply, will not be responsible for a particle of back pressure, for between the heater and the engine you can run a free pipe straight to the atmosphere.

Then, besides, these **COCHRANE HEATERS** will give you the highest attainable temperature, as good purification as can be obtained with exhaust steam, and a freedom from trouble and repairs that would constantly delight you.

More reasons why these "**COCHRANES**" are entitled to your consideration will be found in our Catalogue, **11-H.** These catalogues for the asking.

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mining machinery, flour mill machinery, saw mill machinery, cement machinery, coal mining machinery and sugar machinery.

The Northwestern Mfg. Co. of St. Paul, Minn., has filed an amendment to its articles of incorporation changing its name to the Clyde Iron Works with a capital stock of $100,000.

James B. Clow & Sons, manufacturers of cast iron water pipe, radiators, steam and plumbing goods, have just awarded the contract for a new fireproof warehouse building and a separately constructed marble mill. Work will be begun at once on the building, the site selected being at Franklin and Harrison streets and the south branch of the Chicago river, recently leased by James B. Clow & Sons for a term of 99 years from M. C. McDonald. The lot covers an area of 27,000 square feet. The marble mill is to be completed by the middle of August, and the main building to be ready for occupancy Dec. 1. The main building is to be seven stories and basement in height, with a frontage of 100 feet in Harrison St. and 177 feet in Franklin St. with 177 feet facing the river. The building is to have pile and concrete caisson foundations extending to the hardpan immediately above bedrock. It will be of strictly fireproof construction, with steel beams, columns, etc., and hollow terra cotta tile arches and partitions. The exterior of the building will be faced with dark-red terra cotta and pressed brick on all three fronts. There will be one electric passenger elevator and two large electric freight elevators, one steel freight chute, one spiral package chute, electric trolleys on various floors, tracks for trucks in the basement and all improvements for economical and rapid handling for the heavy merchandise of a plumbing, steam and waterworks supply house. The plumbing of the building will be a feature, including filtered ice-water service, special wash sinks, rain baths for employes, lavatories and other toilet conveniences, set in rooms finished in marble, mosaic and slate. The building will be heated by steam, and the offices will have a complete heating and ventilating system, the air being supplied with a force blast, causing the air to pass over heated coils. The interior walls will be plastered and whitewashed or tinted throughout. Floors will be maple. The building will be electric-lighted. The basement will be fitted up for the storage, handling and cutting of iron pipe; the first story for the greater part as a stockroom for the supply of city trade, the office of the city salesman being on this floor, together with the shipping department. Leading up from the sidewalk at the center of Franklin street front is a very wide and finely finished marble stairway, with vestibule and hallway finished in mosaic and marble. This stairway leads to the general offices on the second floor. Some 15,000 square feet are devoted to these second-floor offices, including fireproof vaults, file-rooms, locker-rooms, toilet rooms, etc., all finished in quarter-sawed white oak. The show-room for display of plumbing fixtures, radiators, heaters, etc., will also be on this floor. On the fourth floor will be located the lockers, lunch rooms, bath rooms, toilet rooms, etc., for the employes in general. The remainder of this floor and all the third and fifth floors will be utilized for storage. The sixth floor will be used for the manufacture and assembling of plumbing fixtures and the seventh floor devoted to a large brass foundry, with its molding, sand, metal and core-rooms and the machine shops. A special feature of this floor is its "saw-tooth" roof of glass and sheet metal, which gives north light from overhead, the arrangement being such that every nook and corner is as light as out of doors. The tanks for water supply will be on the roof. On a triangular piece of ground between the main building and the river will be located a two-story marble mill, including saws, rubbing beds, molding machines, polishers, etc., for the manufacture of all marble in connection with plumbing supplies.

H. S. Vrooman, 18th Place and Sangamon street, Chicago, is adding to his business in fire brick and molding sand, a complete line of foundry supplies, consisting of shovels,

The Robert Field Company,

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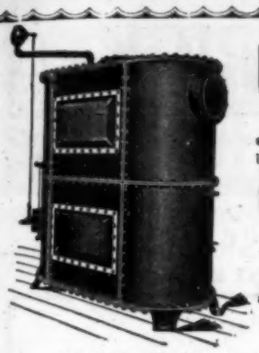

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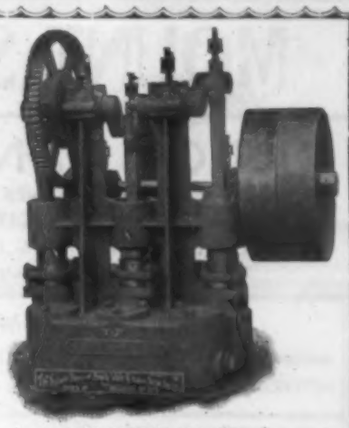

Triplex Boiler Feed Pump.

brushes, bellows, corrugated and flat bottomed riddles, etc. Mr. Vrooman will manufacture all his own goods, for which he has exceptional facilities in the large building into which he recently moved. J. T. Brand, who was formerly connected with S. H. Brand & Co., Chicago, will have charge of the foundry supply department.

Philip D. Sloan, who was formerly connected with the Garden City Sand Co., of Chicago, was recently appointed general sales agent of the Wisconsin Lime & Cement Co., Chicago, with offices at 605 Chamber of Commerce.

The Chicago, Milwaukee & St. Paul has let contracts for the erection of new shops at St. Paul, Minn. The building will be 120x260 feet, and will contain a riveting tower and two traveling cranes of 50 and 5 tons, respectively. The building will be constructed of steel, with masonry walls, and will cost $60,000.

The American Bridge Co. is building a new tool house, 70x144 feet for the erecting department of the company's plant at Stewart Ave. and Forty-first St., Chicago.

The Buckeye Foundry Co., South St. Paul, Minn., will erect a branch plant in St. Paul.

The Wanless Iron Co., Duluth, Minn., has been incorporated with a capital stock of $50,000. The incorporators are James Wanless, Lee W. Farmer and Chester A. Congdon, all of Duluth.

It is reported that efforts are being made to consolidate four large manufacturers of brake beams: The Chicago Railway Equipment Co., Chicago; the Monarch Brake Beam Co., Detroit; the Interchangeable Brake Beam Co., St. Louis, and the Sterling Brake Beam Co., of Boston. The plan is to organize with $5,000,000 capital.

Two representatives of the German government have been in Chicago for several days studying the shop methods and improved machinery in various manufacturing plants in that city. These gentlemen are Tjard Schwarz, imperial high director of marine, and Prof. E. Von Halle, mechanical expert, both of the German navy. Upon their arrival the German consul referred them to the Chicago Pneumatic Tool Co., and J. W. Duntley, president of the company, took them through the shipyards at South Chicago, and to various plants in the city noted for modern equipment. Both gentlemen expressed themselves as greatly pleased. They have been in this country several months, during which time they have visited many of the large shipbuilding plants, steel mills and machine shops.

The Michigan College of Mines is planning for the erection of two much needed buildings, which have been providd by the State; one for the department of civil and mining engineering, and the other for the department of chemistry and metallurgy. The mining engineering building will provide mining and hydraulics laboratories, together with lecture and class rooms, all equipped with modern appliances. It will cost $42,500. The building devoted to chemistry and metallurgy, with its equipment, will cost $35,000. Its laboratories will be fitted up in accordance with modern ideas of lighting, plumbing and ventilation. The appropriation provides also for an addition to the present engineering building which will accommodate the course in blacksmithing. The equipment of the electrical laboratory will be extended and the central heating plant enlarged, to take car of the added buildings.

In view of the large number of students who will visit the Pan-American Exposition, the International Correspondence Schools, Scranton, Pa., have established a free information bureau at their Buffalo office. Arrangements have been made to secure accommodations both in hotels and private families during the exposition. The address of the bureau is International Correspondence Schools, Ellicott Square Building, Buffalo.

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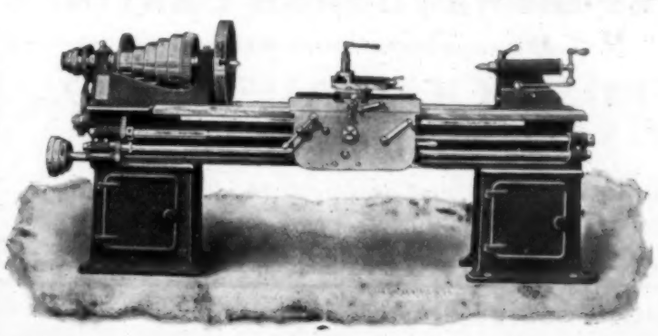

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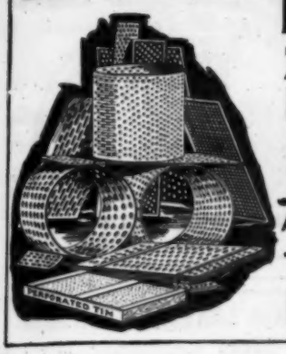

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HANDBOOK

EXTRACT FROM PREFACE:

In the preparation of the second edition of our Handbook, the general plan of the first edition has been followed, viz., to present in concise form such data and information as are useful to the chemist and metallurgist. Several tables of the first edition, which were of somewhat limited use, have been omitted, while more than one hundred pages of new matter have been added.

The methods for analysis of iron ore, iron and steel and for assaying have been given briefly, but perhaps as much in detail as is consistent with the general scope of the book. Several changes and additions to the Specific Gravity tables have been made by adoption of later and more accurate values.

In the notes on blast furnace practice have been outlined the more important theoretical and practical points, which, it is hoped, will be of some service to those interested in the manufacture of iron.

The hygrometric table gives the necessary information for determining the amount of moisture in air, a subject whose importance in metallurgical operations is being more fully recognized at present than heretofore. This table is new and is based on the most accurate data available at the present time.

The tables of weights and measures, United States and foreign, have been very much amplified, and the conversion tables for United States and metric weight and measures of the U. S. Coast and Geodetic Survey included, the latter being based on the legal standard for this country

Numerous miscellaneous tables have been added, which, it is hoped, will be found of value

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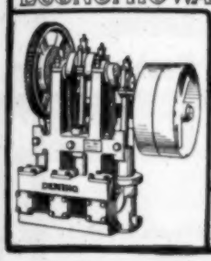

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4:00	1:05	7:00	Lorain	3:37	12:02	7:15
4:18	1:25	7:20	Elyria.....	3:14	11:45	6:50
4:36	1:53	7:43	Grafton	2:56	11:29	6:41
4:58	2:15	8:05	Lester Jun...	2:32	11:06	6:21
5	3	1	Main Line.	2	4	6
P.M.	P.M.	A.M.		A.M.	A.M	P.M.
5:10	1:35	7:50	Cleveland.....	9:50	12:00	6:00
6:20	2:31	8:27	Lester Jun....	8:48	11:07	5:00
6:31	2:40	8:36	Medina	8:36	10:59	4:48
6:54	2:59	8:57	Seville	8:14	10:40	4:26
7:00	3:04	9:03	Sterling	8:03	10:34	4:20
7:22	3:24	9:24	Warwick.....	7:41	10:13	3:56
7:30	3:32	9:31	Canal Fult'n	7:34	10:06	3:48
7:50	3:50	9:50	Ar. Dep. Massillon.	7:15 P.M.	9:50	3:30
7:50	3:50	9:50	Dep. Ar.	7:50	9:50	3:30
8:05	4:06	10:05	Justus.....	7:34	9:35	3:13
8:35	4:37	10:36	Canal Dover	7:03	9:05	2:44
8:42	4:44	10:43	New Phila....	6:55	8:58	2:37
9:00	5:01	11:00	Ar. Dep. Urichsville	6:38	8:40	2:20
7 A.M.						
7:30	5:10	11:10	Dep. Ar.	6:38	8:40	2:20
8:06	5:43	11:42	Freeport	6:00	8:06	1:44
		P.M.				
8:32	6:07	12:05	Flushing	5:34	7:42	1:20
9:40	7:05	1:05	Bridgeport....	4:30	6:45	12:20

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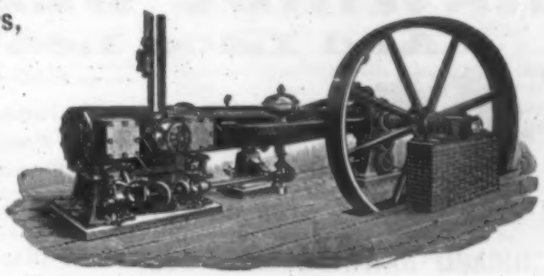

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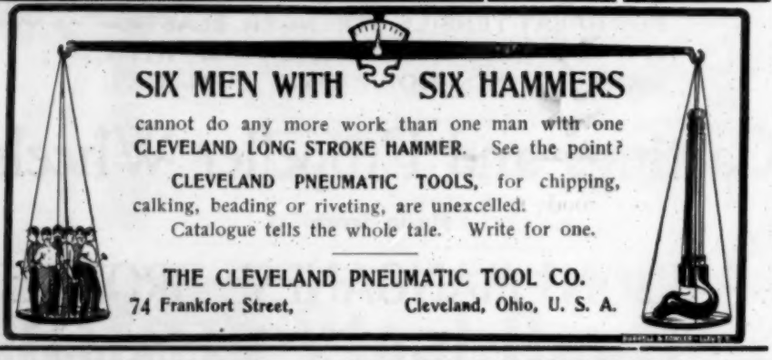

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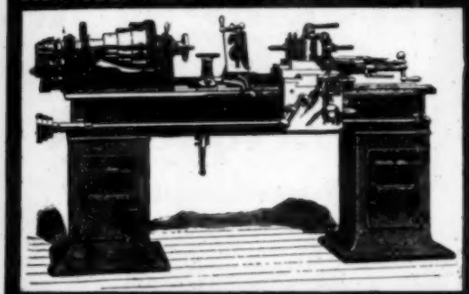

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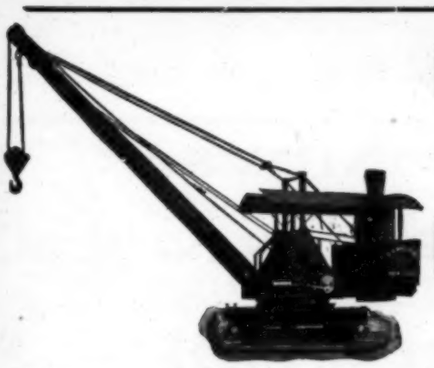

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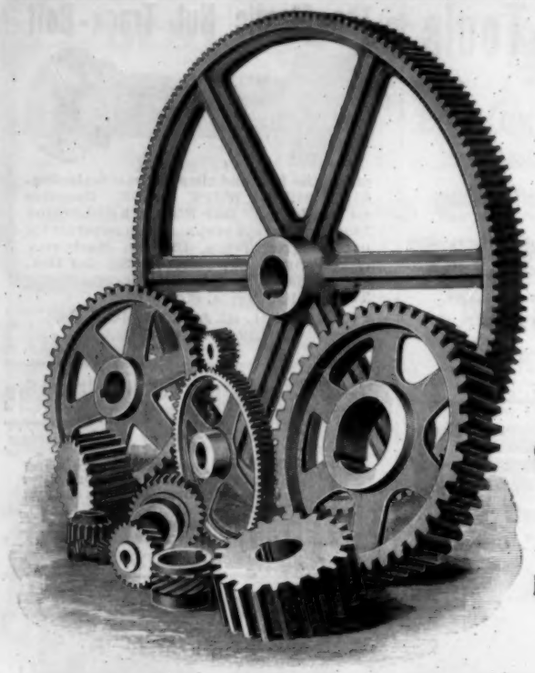

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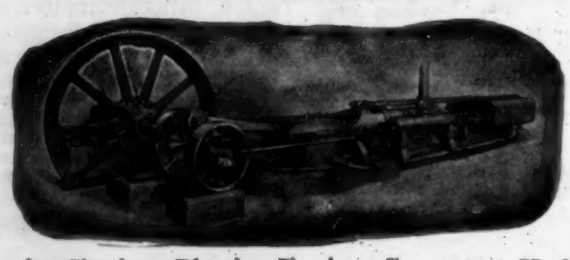

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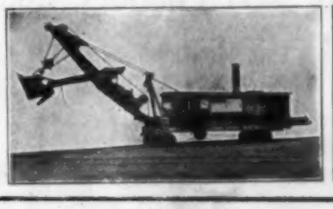

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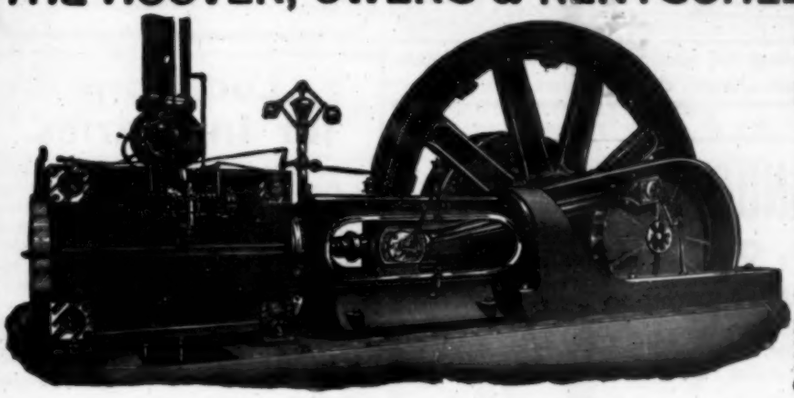

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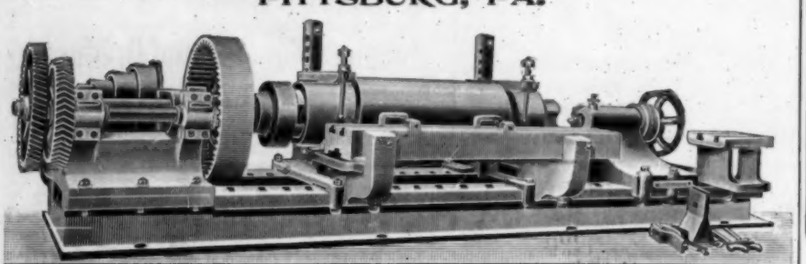

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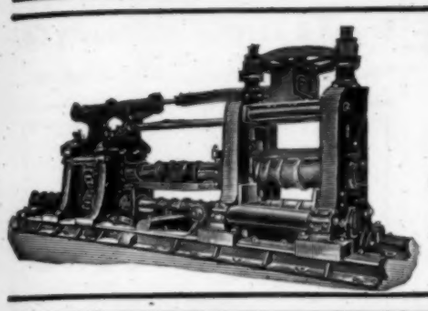

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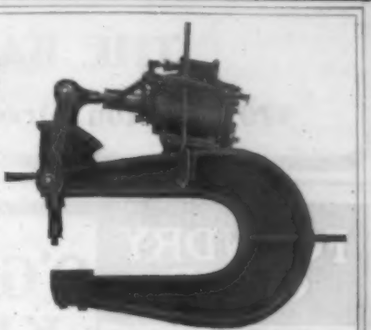

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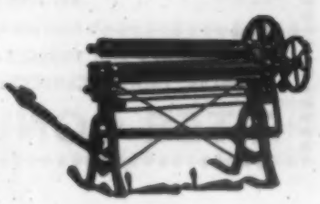

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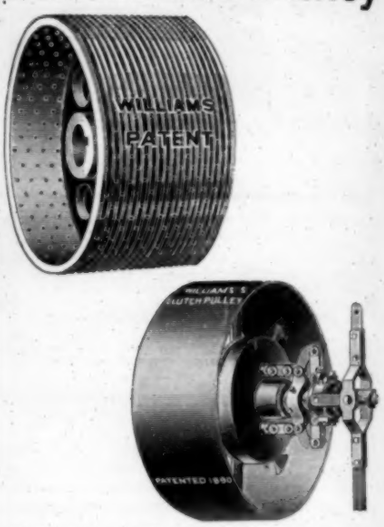

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